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Family and carer smoking control programmes for reducing children's exposure to environmental tobacco smoke (Review)

Baxi R, Sharma M, Roseby R, Polnay A, Priest N, Waters E, Spencer N, Webster P

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[Intervention Review]

Family and carer smoking control programmes for reducing children's exposure to environmental tobacco smoke

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ABSTRACT

Background

Children's exposure to other people's cigarette smoke (environmental tobacco smoke, or ETS) is associated with a range of adverse health outcomes for children. Parental smoking is a common source of children's exposure to ETS. Older children are also at risk of exposure to ETS in child care or educational settings. Preventing exposure to cigarette smoke in infancy and childhood has significant potential to improve children's health worldwide.

Objectives

To determine the effectiveness of interventions aiming to reduce exposure of children to ETS.

Search methods

We searched the Cochrane Tobacco Addiction Group Specialized Register and conducted additional searches of the Cochrane Central Register of Controlled Trials (CENTRAL), MEDLINE, PsycINFO, EMBASE, CINAHL, ERIC, and The Social Science Citation Index & Science Citation Index (Web of Knowledge). Date of the most recent search: September 2013.

Selection criteria

Controlled trials with or without random allocation. Interventions must have addressed participants (parents and other family members, child care workers and teachers) involved with the care and education of infants and young children (aged 0 to 12 years). All mechanisms for reduction of children's ETS exposure, and smoking prevention, cessation, and control programmes were included. These include health promotion, social-behavioural therapies, technology, education, and clinical interventions.

Data collection and analysis

Two authors independently assessed studies and extracted data. Due to heterogeneity of methodologies and outcome measures, no summary measures were possible and results were synthesised narratively.

Main results

Fifty-seven studies met the inclusion criteria. Seven studies were judged to be at low risk of bias, 27 studies were judged to have unclear overall risk of bias and 23 studies were judged to have high risk of bias. Seven interventions were targeted at populations or community settings, 23 studies were conducted in the 'well child' healthcare setting and 24 in the 'ill child' healthcare setting. Two further studies conducted in paediatric clinics did not make clear whether the visits were to well or ill children, and another included both well and ill child visits. Thirty-six studies were from North America, 14 were in other high income countries and seven studies were from low- or middle-income countries. In only 14 of the 57 studies was there a statistically significant intervention effect for child ETS exposure reduction. Of these 14 studies, six used objective measures of children's ETS exposure. Eight of the studies had a high risk of bias, four had unclear risk of bias and two had a low risk of bias. The studies showing a significant effect used a range of interventions: seven used intensive counselling or motivational interviewing; a further study used telephone counselling; one used a school-based strategy; one used picture books; two used educational home visits; one used brief intervention and one study did not describe the intervention. Of the 42 studies that did not show a significant reduction in child ETS exposure, 14 used more intensive counselling or motivational interviewing, nine used brief advice or counselling, six used feedback of a biological measure of children's ETS exposure, one used feedback of maternal cotinine, two used telephone smoking cessation advice or support, eight used educational home visits, one used group sessions, one used an information kit and letter, one used a booklet and no smoking sign, and one used a school-based policy and health promotion. In 32 of the 57 studies, there was reduction of ETS exposure for children in the study irrespective of assignment to intervention and comparison groups. One study did not aim to reduce children's tobacco smoke exposure, but rather aimed to reduce symptoms of asthma, and found a significant reduction in symptoms in the group exposed to motivational interviewing. We found little evidence of difference in effectiveness of interventions between the well infant, child respiratory illness, and other child illness settings as contexts for parental smoking cessation interventions.

Authors' conclusions

While brief counselling interventions have been identified as successful for adults when delivered by physicians, this cannot be extrapolated to adults as parents in child health settings. Although several interventions, including parental education and counselling programmes, have been used to try to reduce children's tobacco smoke exposure, their effectiveness has not been clearly demonstrated. The review was unable to determine if any one intervention reduced parental smoking and child exposure more effectively than others, although seven studies were identified that reported motivational interviewing or intensive counselling provided in clinical settings was effective.

PLAIN LANGUAGE SUMMARY

Can interventions for parents and people caring for children reduce children's exposure to tobacco smoke

Background

Children exposed to cigarette smoke (environmental tobacco smoke) are at greater risk of lung problems, infections and serious complications including sudden infant death syndrome. Preventing exposure to cigarette smoke in infancy and childhood might therefore significantly improve children's health worldwide. Parental smoking is a common source of cigarette exposure for children. Older children are also at risk of exposure to cigarette smoke in child care or educational settings.

Objectives

To determine the effectiveness of interventions aiming to reduce exposure of children to tobacco smoke.

Methods

A review of the research on the effect of interventions aimed at family and caregivers to reduce children's exposure to tobacco smoke was undertaken by researchers in the Cochrane Collaboration. Family and caregivers were defined as parents and other family members, child care workers and teachers involved with the care and education of infants and young children (aged 0 to 12 years). We searched a number of databases for relevant research. This was an update of a previously undertaken review, and the date of the most recent search was September 2013. Two authors independently assessed the research studies and documented all the information needed.

Results

Fifty-seven studies of mixed quality were included in this review. Only 14 studies reported an intervention that was successful at reducing children's exposure to tobacco smoke. These studies used a range of interventions, including seven that used more intensive counselling

methods or motivational interviewing. Of the 42 studies that did not show a significant reduction in child tobacco smoke exposure, 14 used more intensive counselling methods or motivational interviewing. One study did not aim to reduce children's tobacco smoke exposure, but reduce symptoms of asthma, and successfully reduced symptoms using motivational interviewing.

Authors' conclusions

Although several interventions, including parental education and counselling programmes, have been used to try to reduce children's tobacco smoke exposure, their effectiveness has not been clearly demonstrated. The review was unable to determine if any particular interventions reduced parental smoking and child smoke exposure more effectively than others, although seven studies were identified that reported intensive counselling or motivational interviewing provided in clinical settings was effective.

BACKGROUND

Active smoking has been recognised as harmful to the smoker for over six decades, since the landmark Doll and Hill publication (Doll 1950), but it was not until 1974 that the medical literature first discussed parental smoking, exposure to environmental tobacco smoke (ETS), and its effect on the child (Harlap 1974). There is now overwhelming evidence that parental smoking is associated with a range of adverse health effects for children (NHMRC 1997). Perhaps its most obvious association is with increased risk, increased severity, and greater likelihood of admission to hospital with lower (Strachan 1997) and upper (Strachan 1998) respiratory tract disease. An increasing body of evidence describes an association between parental smoking and children's increased risk of serious bacterial infections such as meningitis (Iles 2001). In addition, ETS exposure increases health service use and costs (Lam 2001).

Furthermore, parental smoking confers a significantly increased risk for sudden infant death syndrome (SIDS) (Golding 1997). This effect is present regardless of which parent is the smoker (Blair 1999), and is the strongest modifiable risk factor for SIDS. In addition, research across several continents over the last two decades has found children of smokers to have an increased risk of uptake in adolescence, perhaps as a result of role modelling and/or increased access to cigarettes.

Parental smoking is a common but preventable source of infant and childhood morbidity. The World Health Organization (WHO) has identified the need to reduce parental smoking as a key element of action to encourage health and development in early childhood, particularly among those living in difficult social and economic circumstances (WHO 1999). In some countries, strong relationships between socioeconomic status and environmental quality are evident, with strategies to reduce smoking and improve child health outcomes needing to be underpinned by recognition of the limited resources and control some individuals and families have over environmental and social situations.

Infants' and toddlers' exposure to smoking primarily occurs within the home environment, as this is where they spend most of their time. Older children may also be exposed to smoking in a variety of child care and educational settings in which they spend their time. As children increase their time spent in commercial and informal child care settings, the importance of child care workers' behaviours increases. Similarly, the environments in which young children are exposed extend beyond the home to include shopping centres, meeting places, and other social environments.

Tobacco cessation strategies and interventions to reduce environmental tobacco smoke have had mixed success. Systematic reviews have previously demonstrated that individual counselling increases cessation rates (Lancaster 2005) and that simple advice from a physician has a positive effect in triggering quit attempts (Stead 2008). In relation to children's exposure in utero and in the early years, smoking cessation interventions for pregnant women can be effective in terms of reducing smoking (Lumley 2009). Legislation for smoking bans in public places has been introduced in North America, Australia and in some European countries, and has been associated with reduced incidence of acute myocardial infarctions in adults, lower smoking prevalence and high levels of public support (Lemstra 2008), and reduced exposure to ETS in the workplace and in bars and restaurants (CDC 2007; Galan 2008). However, inconsistent effects of such bans on exposure to ETS in the home have been reported, with some detecting minimal change (Galan 2008) and others a significant change in reported exposure (Edwards 2008).

OBJECTIVES

The objectives of this review are:

1. To evaluate the effectiveness of programmes for both the prevention and cessation of smoking by those who interact with children, including parents and other family members, child care workers,

and teachers, and the effect on health outcomes in infants, toddlers and young children.

2. To examine and detail the indicators of intervention processes and to identify outcomes of importance to those involved in the care of children and young people.

A priori hypotheses:

1. Smoking cessation and prevention programmes are able to improve carers' knowledge and awareness of the effects of tobacco smoking on the health of children.

2. Smoking cessation and prevention programmes can produce behaviour change in carers, leading to a reduction in children's exposure to environmental tobacco smoke (ETS).

3. Smoking cessation and prevention programmes are able to reduce the short-term illnesses experienced by young children exposed to tobacco smoke (though attribution to a particular type of intervention may be difficult to determine).

4. There is a difference in the effectiveness of interventions aiming simply to change knowledge (and thereby expecting behaviour change to occur) compared with those explicitly aiming to change behaviours by effecting change in attitude or skills.

METHODS

Criteria for considering studies for this review

Types of studies

Controlled trials with or without random allocation.
In this updated review, we have not evaluated the effects and impacts of recent legislative changes on smoking and ETS exposure, as this has been addressed in a previous review (Callinan 2010). We have therefore decided against including a greater diversity of study designs, such as before and after studies, interrupted time series studies and other methods appropriate to evaluating population level interventions.

Types of participants

People (parents and other family members, child care workers and teachers) involved with care and education of infants and young children (aged 0 to 12 years).

Types of interventions

We included all mechanisms for reduction of children's ETS exposure, and smoking prevention, cessation, and any other tobacco control programmes targeting the participants described above. These included health promotion, social-behavioural therapy, technology, and educational and clinical interventions.
We included studies where the primary aim was to reduce children's exposure to ETS (thereby preventing adverse health outcomes), but where secondary outcomes included reduction or cessation of familial/parental/carer smoking, or changes in infant and child health measures. We also included studies where the primary outcome was reduction or cessation of familial/parental/carer smoking resulting in reduced exposure for children.
We excluded studies of uptake of smoking by minors.
There was no restriction on who delivered the programmes. These could include researchers, general practitioners, midwives, paediatricians, community and hospital nurses, health promotion agencies, tobacco control and anti-cancer organisations and health departments.

Types of outcome measures

The primary outcome measures were children's exposure to tobacco smoke, child illness and health service utilisation, and the smoking behaviours of children's parents and carers. We included studies where the outcome was only parental or carer's smoking status.
We used biological verification of exposure to or absorption of ETS as the 'gold standard', but did not require it as an inclusion criterion. Where biological verification of exposure/absorption conflicted with parental report of exposure, we have taken the biologically verified result as correct.

Outcomes for children

- Exposure to environmental tobacco smoke (ETS): biochemical measures of children's exposure to ETS using air monitoring for levels of nicotine; other measures of ETS (including parent-reported behaviour change, described in next section)
- Absorption of ETS: biochemical measures of children's absorption of ETS through cotinine in urine, blood, saliva, or hair
- Frequency of childhood illness events, respiratory problems (changes in lung function or symptom scores)
- Use of health services: admission to hospital; frequency of use of general practitioners; frequency of medication use

Outcomes for parents and carers

- Behaviour change in relation to children's exposure to ETS: we noted any reported bans or restrictions on smoking at home or in other environments or designated smoking areas outside the home
- Smoking behaviour, including cessation, reduction or uptake. Biochemically validated measures of smoking behaviour

(for example thiocyanates, cotinine levels in blood, urine or saliva), or self report.

- Maternal smoking status at postpartum
- Costs and cost-effectiveness associated with interventions and outcomes

We report biochemical confirmation of parental self-reported quit status or changes in behaviour such as moves to smoke outside, but did not exclude studies without this measurement. Biochemical validation was not used in the majority of these studies; however, there is conflicting evidence regarding the validity of self report of smoking status. Some authors suggest it is reasonably accurate in community settings (Dwyer 1986; Velicer 1992; Patrick 1994) whereas others suggest parental self reports of smoke consumption and ETS are frequently under-estimated (Jarvis 1987; Ford 1997; Matthews 1999). For example, in clinical situations where a clinician is the interviewer, social bias may influence the report towards the socially desired response.

Levels of nicotine or its breakdown products, by contrast, are often preferred as a measure of real reductions in smoking or ETS. Smoke exposure can be detected by hair cotinine (Zahlsen 1994; Nafstad 1997; Al-Delaimy 2002a; Al-Delaimy 2002b) and absorption by urinary cotinine (Jarvis 1984; Bakoula 1995). Long-term exposure is best estimated by hair nicotine, whereas urinary cotinine is more informative of short-term exposure. Cotinine is a metabolic breakdown product of nicotine with a half-life of about one day (Haley 1983). The half-life is longer in nonsmokers such as infants and young children (Idle 1990). Cotinine is concentrated in the urine by the kidney and so becomes a sensitive indicator of ETS exposure over the previous few days. Urine creatinine measurements may be used to adjust for urine concentration (Thompson 1990); the urinary cotinine creatinine ratio (CCR) measurement has become a common method for measuring the levels of short-term ETS exposure. Saliva cotinine approximates to blood cotinine concentrations and collection is simple and non-invasive.

Search methods for identification of studies

This is the third update of this review. Search methods for the previous searches are described in previously published versions of this review (Roseby 2002; Priest 2008)

The search was updated by Nia Wyn Roberts, Outreach Librarian, Bodleian Health Care Libraries. We searched the Cochrane Central Register of Controlled Trials [The Cochrane Library, Wiley] (Issue 2011), Medline [OvidSP] (1948 - present), Embase [OvidSP] (1974 - present), CINAHL [EbscoHOST] (1980 - present), PsycINFO [OvidSP] (1967 - present), and ERIC [Proquest] (1966 - present). A search for articles from 2007-2011 was conducted in June 2011. The Trial Search Coordinator searched the CochraneTobacco Addiction Group's Specialised Register. The update searches were conducted in April 2012, and further update searches were conducted in September 2013.

The reports of all references identified as possibly being randomised controlled trials (RCTs) or controlled trials (CTs) were obtained and reviewed. Secondly, reference lists of all identified RCTs or CTs were checked to identify potentially relevant citations. We made enquiries regarding other known published or unpublished studies so that these results could be included in our review.

Search strategies for the key databases are shown in: Appendix 1 (MEDLINE); Appendix 2 (EMBASE); Appendix 3 (CINAHL); Appendix 4 (PsycINFO); Appendix 5 (ERIC); and Appendix 6 (Cochrane Library).

Data collection and analysis

Two reviewers independently undertook assessment of quality and extraction of study details and results. For this update, RB reviewed all of the studies, MS reviewed three quarters of the studies, and RR, AP and NP each reviewed a proportion of the remaining studies, and compared results. We created a data extraction spreadsheet in Microsoft Excel.

We extracted information on methods, participants, intervention and control conditions, and outcomes. We were particularly interested in aspects of intervention development that may have contributed to a stronger, more appropriate or sustained intervention. We extracted information on the theory underlying the intervention development and content, process indicators and descriptions of community consultation and/or participation in the planning and implementation of the intervention, incentives (if present), and concerns of intervention programmes. We also recorded any information about costs, either in terms of evaluations of cost-effectiveness, or simply where costs were mentioned. Where possible we examined outcomes by gender, age and socio-economic status.

We resolved differences between reviewers' extraction results by discussion or by consultation with a third reviewer. Given the heterogeneity of study design and characteristics, we considered a quantitative estimate of effect to be inappropriate. The synthesis is therefore narrative.

Assessment of risk of bias in included studies

Risk of bias was assessed for all included studies, including those included in previous version of this review, by two authors independently of each other. Risk of bias was categorised as High, Low, or Unclear in accordance with the methods described in the Cochrane Handbook (Higgins 2011) for randomisation, allocation concealment, incomplete data, blinding of outcome assessment, and other bias. For the current update this was undertaken by all authors who undertook data extraction. Risk of bias for previously included studies was assessed by Jamie Hartmann-Boyce

from the Cochrane Tobacco Addiction Group. Differences were resolved by discussion.

(1) Sequence generation (checking for possible selection bias)

We have described the methods used to generate the allocation sequence, and have assessed the methods as:

- low risk of bias (any truly random process, e.g. random number table, computer random number generator);
- high risk of bias (any non random process, e.g. odd or even date of birth, hospital or clinic record number); or
- unclear.

(2) Allocation concealment (checking for possible selection bias)

We have described the method used to conceal the allocation sequence in sufficient detail to determine whether intervention allocation could have been foreseen in advance of, or during recruitment, or changed after assignment. We have assessed the methods as:

- low risk of bias (e.g. telephone or central randomisation; consecutively numbered sealed opaque envelopes);
- high risk of bias (open allocation; unsealed or non-opaque envelopes; alternation; date of birth);
- unclear

(3) Blinding (checking for possible detection bias)

We have described the methods used, if any, to blind study participants and personnel from knowledge of which intervention a participant received. With educational interventions (such as those assessed in this review) it is often not possible to blind participants to group allocation, and hence we did not evaluate blinding based on performance bias but rather based solely on the potential to introduce detection bias. It is possible for outcome assessors to be blind to group allocation and we have noted where there was partial blinding. We have assessed the methods as high risk of bias, low risk of bias, or unclear.

Where findings were objectively measured (biochemical validation, household air nicotine monitors) we assessed blinding as adequate to prevent detection bias.

(4) Incomplete outcome data (checking for possible attrition bias through withdrawals, dropouts, or protocol deviations)

Within each included study, we have described for each outcome or class of outcomes the completeness of data including attrition and exclusions from analysis. We have noted whether attrition and exclusions were reported, the numbers included in the analysis at each stage (compared with the total randomised participants), reasons for attrition or exclusion where reported, and whether missing data were balanced across groups.

(5) Other bias (e.g. selective reporting bias)

We noted any other potential sources of bias that were not related to the above four.

Overall risk of bias

We made explicit judgements about whether studies were at high, moderate, or low risk of bias, according to the criteria given in the Cochrane Handbook (Higgins 2011). With reference to 1 to 5 above, we assessed the likely magnitude and direction of bias and whether we considered it likely to impact on the findings.

RESULTS

Description of studies

We included 57 studies in this review, 21 of which were identified in the most recent update (Van't Hof 2000; Pulley 2002; Culp 2007; Ekerbicer 2007; French 2007; Ralston 2008; Hannover 2009; Hovell 2009; Borrelli 2010; Baheiraei 2011; Butz 2011; Halterman 2011; Herbert 2011; Wilson 2011; Patel 2012; Phillips 2012; Stotts 2012; Chellini 2013; Prokhorov 2013; Ralston 2013; Tyc 2013). The characteristics of the included studies are summarized below. Further detail is available in the Characteristics of included studies table.

A further nine studies were identified for which the outcome data are not yet available, four of which were identified in the previous update (Sockrider 2003; Wilson 2005; Chan 2006b; Johnston 2010; Ortega 2010; Rosen 2011; Chan 2012; Hutchinson 2013; Stotts 2013). Information about these ongoing studies is provided in the Characteristics of ongoing studies table.

Twenty-three studies were excluded from the review (Philips 1990; Meltzer 1993; Murray 1993; Campion 1994; Wilson 1996; Manfredi 1999; Spencer 2000; Cookson 2000; Emmons 2000; Arborelius 2001; Badger 2003; Okah 2003; Morgan 2004; Loke 2005; Turner-Henson 2005; Stepans 2006; Klinnert 2007; Burmaz 2007; Oien 2008; Hovell 2011; Gadomski 2011; Kegler 2012; Winickoff 2013). These were excluded for a variety of reasons, the most common being: study design; participants not meeting inclusion criteria; outcomes not related to environmental tobacco smoke exposure; and no outcome data. Further information is available in the Characteristics of excluded studies table.

Intervention setting

Of the 57 studies reported in this review, only seven were targeted at the population or community level. The majority of studies targeted parents within healthcare contexts, with 23 targeting parents in 'well child' settings and 24 reporting interventions in 'ill child' healthcare settings. A further two studies reported on interventions in paediatric clinics but did not designate whether they were in the context of 'well child' or 'ill child' settings, and a further one included both well and ill child visits.

Interventions targeted at population or community settings (for example, communities, schools etc)

This review identified seven eligible studies of interventions targeted at the population or community level. One of them evaluated outcomes for smoking mothers who called a telephone smoking cessation assistance counselling service (Davis 1992). Three studies examined the effectiveness of school-based strategies (Zhang 1993; Elder 1996; Ekerbicer 2007) but used different approaches to limiting children's exposure to ETS. Halterman 2011 also recruited parents of children in school, but specifically targeted asthmatic children ('ill child' setting). A community-based intervention from the USA used trained lay bicultural and bilingual community health advisors to work with Latino families to problem-solve and to develop strategies to lower children's exposure to tobacco smoke in the home (Conway 2004). Herbert 2011 recruited families to participate in the study through five public health nursing offices, eight daycare centres, and kindergartens on Prince Edward Island. Prokhorov 2013 recruited from a cohort of Hispanic Americans, "mano a mano" in Houston, Texas.

Opportunistic interventions targeted at parents of children in the 'well child' healthcare setting

Compared to the relatively few community and population level interventions identified by this review, we found far more studies that evaluated interventions within 'well child' healthcare settings. Twenty-three included studies examined the effect of interventions delivered to parents in this context, and these recruited participants postnatally, at 'well child' health visits or at infant immunisation clinics. Thirteen of these studies were peripartum, recruiting participants via maternity hospitals, from their records, or via midwives and general practitioners (Woodward 1987; Greenberg 1994; Severson 1997; Armstrong 2000; Van't Hof 2000; Emmons 2001; Ratner 2001; Pulley 2002; Schonberger 2005; Wiggins 2005; Culp 2007; French 2007; Hannover 2009). 'Well child' health check visits to a doctor or maternal child health nurse were used by Chilmonczyk 1992; Vineis 1993; Eriksen 1996; Fossum 2004; Zakarian 2004; Abdullah 2005; Kallio 2006; Winickoff 2010; Baheiraei 2011. Chellini 2013 recruited from hospital and public health facility waiting rooms, and also from supermarkets.

Opportunistic interventions targeted at parents of children with health problems

Interventions conducted in the 'ill child' health care setting were reported in 24 studies. Of these, 13 were interventions targeted at the parents of children with respiratory problems (Hughes 1991; McIntosh 1994; Wahlgren 1997; Irvine 1999; Wilson 2001; Hovell 2002; Krieger 2005; Ralston 2008; Borrelli 2010; Butz 2011; Halterman 2011; Wilson 2011; Stotts 2012). Halterman 2011 targeted children in school with asthma, rather than recruiting from a health care setting. Nine studies were conducted in non-respiratory 'ill child' health care settings (Groner 2000; Hovell 2000; Wakefield 2002; Kimata 2004; Chan 2005; Chan 2006a; Hovell 2009; Phillips 2012; Tyc 2013). Patel 2012 and Ralston 2013 targeted children presenting to the emergency department, approximately 40% of whom had a respiratory presenting complaint. Hovell 2000 and Hovell 2009 recruited mothers from a Special Supplemental Nutrition Program for Women, Infants and Children, and looked at the effectiveness of counselling on smoking rates and children's ETS exposure among women of low income, high risk and ethnically diverse backgrounds. A further two studies conducted in paediatric clinics do not make clear whether they are in the context of 'well child' or 'ill child' health visits (Curry 2003; Nuesslein 2006), while Yilmaz 2006 recruited children visiting paediatric clinics for either primary conditions or a 'well child' visit.

Main target of intervention

Reduction of children's ETS exposure can be achieved by encouraging avoidance of children's exposure to cigarettes smoked, such as the child or the smoker moving to a different location, reducing the number of cigarettes smoked by parent or carer, or the smoker ceasing to smoke altogether. The aims of the studies identified by this review were heterogeneous. Only smoking and ETS targets are considered here; other intervention components, such as healthy eating (e.g. Elder 1996), asthma management (e.g. Hughes 1991), or household safety (e.g. Culp 2007) are not described.

Of the 57 included studies, 15 aimed solely for parental or carer smoking cessation or reduction (Vineis 1993; Zhang 1993; Severson 1997; Groner 2000; Emmons 2001; Wakefield 2002; Curry 2003; Kimata 2004; Chan 2005; Wiggins 2005; Kallio 2006; Nuesslein 2006; Ralston 2008; Borrelli 2010; Ralston 2013). Sixteen studies aimed solely for reducing children's exposure to cigarettes smoked (Chilmonczyk 1992; Davis 1992; Elder 1996; Wahlgren 1997; Hovell 2000; Wilson 2001; Pulley 2002; Baheiraei 2011; Butz 2011; Herbert 2011; Wilson 2011; Patel 2012; Stotts 2012; Chellini 2013; Prokhorov 2013; Tyc 2013), while twenty one studies aimed for a combination of parental or carer cessation, reduction or avoidance (Woodward 1987; Hughes 1991; Greenberg 1994; McIntosh 1994; Eriksen 1996; Irvine 1999; Armstrong 2000; Hovell 2000; Conway 2004; Fossum 2004; Zakarian 2004; Abdullah 2005; Krieger 2005; Schonberger

2005; Chan 2006a; Yilmaz 2006; Culp 2007; Ekerbicer 2007; Hovell 2009; Winickoff 2010; Halterman 2011). Five studies aimed to prevent reuptake of smoking postpartum (Van't Hof 2000; Ratner 2001; French 2007; Hannover 2009; Phillips 2012). All studies aimed to achieve changes in behaviour in some way in order to reduce child ETS exposure. Eight studies did not expressly include an education or knowledge-building component in their interventions, but instead targeted change in attitudes and behaviours (Chilmonczyk 1992; Zhang 1993; Wahlgren 1997; Hovell 2000; Curry 2003; Zakarian 2004; Chan 2005; Nuesslein 2006).

Location of studies

The majority of studies were from high income countries. Thirty-six studies were from North America, with 33 from the USA (Chilmonczyk 1992; Davis 1992; Greenberg 1994; McIntosh 1994; Elder 1996; Severson 1997; Wahlgren 1997; Groner 2000; Hovell 2000; Van't Hof 2000; Emmons 2001; Wilson 2001; Hovell 2002; Pulley 2002; Curry 2003; Conway 2004; Zakarian 2004; Krieger 2005; Culp 2007; French 2007; Ralston 2008; Hovell 2009; Borrelli 2010; Winickoff 2010; Butz 2011; Halterman 2011; Wilson 2011; Patel 2012; Phillips 2012; Stotts 2012; Prokhorov 2013; Ralston 2013; Tyc 2013) and three from Canada (Hughes 1991; Ratner 2001; Herbert 2011). Three studies were from Australia (Woodward 1987; Armstrong 2000; Wakefield 2002), with two from each of the UK (Irvine 1999; Wiggins 2005), Germany (Nuesslein 2006; Hannover 2009) and Italy (Vineis 1993; Chellini 2013). There was one study reported from each of Finland (Kallio 2006), Japan (Kimata 2004), Sweden (Fossum 2004), the Netherlands (Schonberger 2005) and Norway (Eriksen 1996). Ten of the studies in high income countries specifically targeted disadvantaged, low income and/or culturally diverse populations. Seven studies were from low or middle income countries, with four from China (Zhang 1993; Abdullah 2005; Chan 2005; Chan 2006a), two from Turkey (Yilmaz 2006; Ekerbicer 2007) and one from Iran (Baheiraei 2011).

Participants

Twenty-one studies targeted mothers only (Chilmonczyk 1992; Davis 1992; Greenberg 1994; Severson 1997; Armstrong 2000; Groner 2000; Hovell 2000; Van't Hof 2000; Ratner 2001; Pulley 2002; Curry 2003; Fossum 2004; Zakarian 2004; Wiggins 2005; Nuesslein 2006; Yilmaz 2006; Culp 2007; French 2007; Hannover 2009; Phillips 2012; Chellini 2013). Hovell 2009 targeted mothers, but invited other family members to participate in counselling. One study (Chan 2006a) targeted fathers through educating their non-smoking wives. Twenty-two studies targeted both parents (Woodward 1987; Hughes 1991; Vineis 1993; McIntosh 1994; Eriksen 1996; Irvine 1999; Emmons 2001; Wilson 2001; Hovell 2002; Wakefield 2002; Conway 2004; Kimata 2004; Abdullah 2005; Chan 2005; Schonberger 2005; Kallio 2006; Ekerbicer 2007; Ralston 2008; Winickoff 2010; Baheiraei 2011; Herbert 2011; Tyc 2013). Zhang 1993 targeted fathers only, Borrelli 2010, Wilson 2011, Patel 2012 and Ralston 2013 targeted a caregiver(s), Elder 1996 targeted teachers only, Wahlgren 1997, Butz 2011 and Stotts 2012 targeted families and Krieger 2005, Halterman 2011 and Prokhorov 2013 targeted households.

Age group

We stratified studies according to the age group of the children: infants (less than one year); preschoolers (up to age six); and school age (six to twelve years). Twenty studies examined measures to reduce ETS exclusively for infants (Woodward 1987; Chilmonczyk 1992; Vineis 1993; Greenberg 1994; Severson 1997; Armstrong 2000; Van't Hof 2000; Ratner 2001; Pulley 2002; Fossum 2004; Zakarian 2004; Abdullah 2005; Wiggins 2005; Culp 2007; French 2007; Hannover 2009; Winickoff 2010; Baheiraei 2011; Phillips 2012; Stotts 2012). Measures to reduce ETS for children up to and including preschool age were examined by eight studies (Davis 1992; Eriksen 1996; Hovell 2000; Emmons 2001; Schonberger 2005; Hovell 2009; Herbert 2011; Patel 2012), while measures for children up to and including school age were considered by sixteen studies (Hughes 1991; Zhang 1993; McIntosh 1994; Elder 1996; Irvine 1999; Groner 2000; Wilson 2001; Wakefield 2002; Conway 2004; Kimata 2004; Krieger 2005; Kallio 2006; Ekerbicer 2007; Butz 2011; Halterman 2011; Wilson 2011). Eight studies examined interventions to reduce ETS that included older age groups: Wahlgren 1997 included parents of children aged 6 to 17 years; Hovell 2002 included parents of children aged 3 to 17 years; Chan 2006a included parents of children from birth to 15 years; Yilmaz 2006 included mothers of children under 16 years of age and Borrelli 2010, Chellini 2013, Prokhorov 2013 and Tyc 2013 included children under 18 years of age. Five studies did not provide the ages of the children (Curry 2003; Chan 2005; Nuesslein 2006; Ralston 2008; Ralston 2013).

Theoretical framework

Thirty of the 57 studies expressly employed a theoretical framework in the design and/or development of the intervention. Eleven studies used motivational interviewing (Emmons 2001; Curry 2003; Chan 2005; French 2007; Hannover 2009; Borrelli 2010; Baheiraei 2011; Halterman 2011; Phillips 2012; Stotts 2012; Ralston 2013). Four used a social learning model (Greenberg 1994; Elder 1996; Conway 2004; Fossum 2004) and six used the stages of change component of Prochaska's transtheoretical model (Abdullah 2005; Krieger 2005; Ralston 2008; Winickoff 2010; Patel 2012; Ralston 2013). Ralston 2013 used stage of change and motivational interviewing. Social cognitive theory was used by two studies (Krieger 2005; Borrelli 2010). McIntosh 1994 developed the activities for the parent manual based on behaviour modifica-

tion theory. Wahlgren 1997 tailored the programme to individual families, and incorporated a number of behavioural modification techniques, including stimulus control, shaping, personal feedback, and contingency contracting. Groner 2000 employed the health belief model, and Wakefield 2002 used a harm minimisation approach, based on previous research indicating that restrictions produced significantly lower urinary cotinine levels. Ratner 2001 utilised Marlatt's relapse model. Chan 2006a used Fishbein's theory of reasoned action and Ajzen's theory of planned behaviour in the development of their educational intervention. Hovell 2009 used the behavioural ecological model for development of the counselling intervention. Herbert 2011 used a family-centred assessment and intervention model to empower families to reduce cigarettes smoked in the home. Winickoff 2010 referred to a number of theories as informing the development of their intervention: the transtheoretical stages of change model, together with social learning theory; health beliefs model; cognitive behavioural theory; Wagner's chronic care model and behavioural and systems theory. Tyc 2013 used behavioural contracting, problem solving and social reinforcement.

Acceptability of intervention to participants

Four studies appeared to have involved consultation with potential participants as part of the development of the intervention (Hughes 1991; Davis 1992; Hovell 2000; Borrelli 2010). Davis 1992 employed focus groups with smokers and nonsmokers to understand their beliefs and attitudes towards smoking and cessation in order to develop improved self-help materials. Borrelli 2010 conducted focus groups to better understand Latino culture and modify the motivational interviewing technique accordingly.

Process indicators

Process indicators provide important information regarding the integrity of the way in which interventions were implemented. However, they were well described in only 22 of the 57 studies (Chilmonczyk 1992; Davis 1992; Greenberg 1994; McIntosh 1994; Eriksen 1996; Severson 1997; Hughes 1991; Hovell 2000; Emmons 2001; Hovell 2002; Wakefield 2002; Fossum 2004; Zakarian 2004; Abdullah 2005; Wiggins 2005; Culp 2007; Hannover 2009; Hovell 2009; Borrelli 2010; Winickoff 2010; Stotts 2012; Tyc 2013). More specifically, seven studies reported that they maintained regular monitoring and support with those responsible for providing the intervention (Hughes 1991; Greenberg 1994; Emmons 2001; Culp 2007; Hannover 2009; Hovell 2009; Borrelli 2010), and twelve reported that they evaluated the extent to which participants received, read, undertook or adhered to the intervention as intended (Davis 1992; McIntosh 1994; Severson 1997; Hovell 2002; Wakefield 2002; Zakarian 2004; Abdullah 2005; Wiggins 2005; Culp 2007; Hovell 2009; Winickoff 2010; Stotts 2012). Among those that commented on the monitoring of study implementation, one study (Severson 1997) recommended the need to prompt the providers over the course of the study to ensure appropriate implementation. One study (Fossum 2004) reported the collection of qualitative data on the opinions of the nurses delivering the intervention.

Biological verification of children's exposure

Twenty studies used biological evidence of children's ETS absorption, measuring cotinine in urine or saliva (Woodward 1987; Chilmonczyk 1992; Greenberg 1994; McIntosh 1994; Irvine 1999; Hovell 2000; Wilson 2001; Hovell 2002; Wakefield 2002; Conway 2004; Kimata 2004; Zakarian 2004; Kallio 2006; Ekerbicer 2007; Hovell 2009; Baheiraei 2011; Butz 2011; Halterman 2011; Wilson 2011; Tyc 2013), and ten studies used environmental monitors of children's exposure to ETS (Wahlgren 1997; Hovell 2000; Emmons 2001; Hovell 2002; Zakarian 2004; Hovell 2009; Borrelli 2010; Butz 2011; Stotts 2012; Prokhorov 2013). Five of the ten used passive sampling nicotine monitors as a primary study outcome (Emmons 2001; Borrelli 2010; Butz 2011; Stotts 2012; Prokhorov 2013). Butz 2011 also measured particulate matter in the child's bedroom and living room. The remaining five used air nicotine monitors to either promote or verify the accuracy of parent report of smoking behaviours. Wahlgren 1997 reported using air nicotine monitors in a room where greatest exposure to ETS was reported for two weeks prior to clinic visits to verify parent report of cigarette consumption. Hovell 2000, Hovell 2002, Zakarian 2004 and Hovell 2009 all used inactive air nicotine monitors placed in three rooms where children's greatest ETS exposure was reported, to promote accurate self report of smoking behaviours by mothers. These studies also placed active air monitors in a selected proportion of the total sample: Hovell 2000 in a randomly selected half of the sample; both Hovell 2002 and Zakarian 2004 in 20% of the sample; and Hovell 2009 in a randomly selected 24% of the sample at six months. Zakarian 2004 reported randomly selecting these homes and placing the monitors in the homes one week before data collection, while Hovell 2002 did not report how the 20% of homes were selected but reported that they were used only for baseline and post-test measures. Cost was given as a reason for not using active air nicotine monitors across the whole sample.

Six interventions used feedback to parents of biological evidence of children's ETS absorption as a stimulus for parental behaviour change (Chilmonczyk 1992; McIntosh 1994; Wilson 2001; Wakefield 2002; Ekerbicer 2007; Wilson 2011). Twenty-one studies used biological validation of parental smoking cessation, measuring cotinine in urine, saliva or serum (Woodward 1987; Irvine 1999; Hovell 2000; Hovell 2002; Fossum 2004; Zakarian 2004; Abdullah 2005; Nuesslein 2006; Kallio 2006; French 2007; Hovell 2009; Winickoff 2010; Phillips 2012; Tyc 2013) and/or expired carbon monoxide (Emmons 2001; Ratner 2001; Curry 2003; Abdullah 2005; Schonberger 2005; Borrelli

2010; Stotts 2012).

Length of follow-up

In this review we determined length of follow-up as being from completion of intervention to time of data collection. Length of follow-up is important to determine, as it affects the extent to which sustainability and long-term outcomes can be assessed. While short-term reductions in children's ETS exposure have some benefit to children's health outcomes, the ultimate goal is for long-term and sustained change in order to maximise the positive impact on children's health and well-being as they grow and develop.

Twelve months or more

Seventeen studies included in this review reported a follow-up of at least 12 months from the end of the intervention (Hughes 1991; Vineis 1993; Elder 1996; Severson 1997; Irvine 1999; Ratner 2001; Hovell 2002; Curry 2003; Conway 2004; Krieger 2005; Schonberger 2005; Wiggins 2005; Chan 2006a; Kallio 2006; Hannover 2009; Hovell 2009; Prokhorov 2013).

Six to twelve months

Shorter follow-up periods of between six and twelve months were reported by a further 18 studies (Davis 1992; Zhang 1993; Greenberg 1994; Wahlgren 1997; Groner 2000; Hovell 2000; Emmons 2001; Wilson 2001; Wakefield 2002; Zakarian 2004; Abdullah 2005; Yilmaz 2006; Culp 2007; Ekerbicer 2007; Ralston 2008; Wilson 2011; Patel 2012; Tyc 2013). Wahlgren 1997 debriefed participants at the six-month follow up, and reported ongoing follow up 8 and 18 months after that.

Less than six months

Long-term effectiveness was particularly difficult to assess in studies with follow-up periods of six months or less. McIntosh 1994 reported follow-up periods that varied between four and six months. Stotts 2012 reported a follow-up period of six months from baseline, but it was unclear what the follow-up was post-intervention. Twenty studies used a follow-up time of less than six months (Woodward 1987; Chilmonczyk 1992; Eriksen 1996; Armstrong 2000; Van't Hof 2000; Pulley 2002; Fossum 2004; Kimata 2004; Chan 2005; Nuesslein 2006; French 2007; Winickoff 2010; Borrelli 2010; Baheiraei 2011; Butz 2011; Halterman 2011; Herbert 2011; Phillips 2012; Chellini 2013; Ralston 2013).

Sample Size

Twenty-eight of the 57 studies mention conducting a power calculation in the design of their studies (Woodward 1987; Greenberg 1994; McIntosh 1994; Severson 1997; Wahlgren 1997; Irvine 1999; Armstrong 2000; Groner 2000; Hovell 2000; Emmons 2001; Wakefield 2002; Conway 2004; Krieger 2005; Schonberger 2005; Wiggins 2005; French 2007; Ralston 2008; Hannover 2009; Hovell 2009; Borrelli 2010; Baheiraei 2011; Butz 2011; Halterman 2011; Wilson 2011; Phillips 2012; Chellini 2013; Prokhorov 2013; Ralston 2013). Of these McIntosh 1994, Wahlgren 1997 and Borrelli 2010 explicitly mention that the statistical power of their study was limited by the small sample size.

Risk of bias in included studies

To meet inclusion criteria for this review, studies had to be controlled trials. Risk of bias assessment has been completed in this update for all of the included studies. This assessment is summarised in Figure 1 and Figure 2. In this review we considered bias arising from detection bias from misclassification by self report (assessed as part of blinding) particularly important, as well as bias arising from inadequate randomisation, although the review considers controlled studies without randomisation.

Figure 1. Risk of bias summary: review authors' judgements about each risk of bias item for each included study.

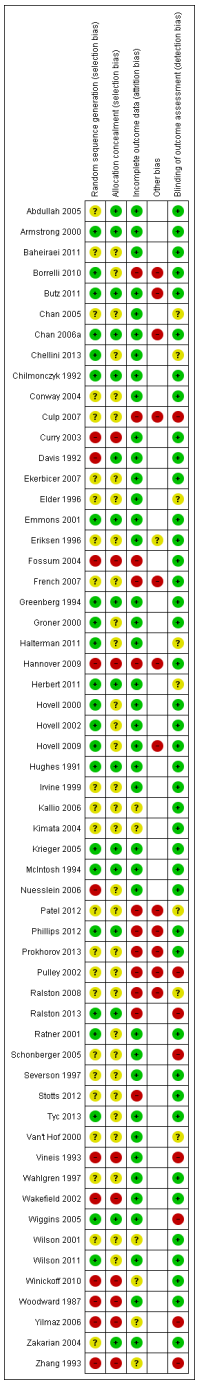

Figure 2. Risk of bias graph: review authors' judgements about each risk of bias item presented as percentages across all included studies.

Allocation

The method of randomisation was rarely described in sufficient detail to permit assessment of whether the allocation was concealed at the time of trial entry. For example, it was common for studies to merely state that participants were randomised. Quasi-randomisation was not uncommon even in large trials. Overall, 34 studies had high or unclear risk of bias from poor randomisation or lack of randomisation. Forty-one studies had a high or unclear risk of bias from allocation concealment with allocation concealment not described in many of the studies.

Blinding (detection bias)

Very few trials had any blinding of participants or providers, largely due to pragmatic issues associated with administering an educational intervention. We have noted in the Characteristics of included studies tables where there was blinding of outcome assessors. Those trials without adequate blinding of outcome assessors or that used a subjective measure of outcome assessment have been classified as "high risk of bias" in this review. Overall, 17 studies had high or unclear risk of bias from blinding of outcome assessment.

Incomplete outcome data

Attrition from withdrawals and exclusions from trials were common and the reasons for these were often not clearly specified. Attrition is potentially a serious risk of bias in these studies. Levels of attrition in each study, and information about any intention to treat analysis have been provided in the Characteristics of included studies. Overall 18 studies had high or unclear risk of bias due to incomplete outcome data.

Other potential sources of bias

Twelve studies were thought to be at high risk of an "other potential source of bias". In six of these studies this related to a difference in the baseline characteristics of groups: two were related to the possibility of contamination between groups; two were related to a lack of intention-to-treat analysis and another two were related to selective reporting.

Effects of interventions

Results are reported by outcome and by setting and child age below. Specific intervention types are discussed within individual outcomes, and are discussed more generally in the Discussion.

Tobacco smoke exposure outcomes

Of the 57 studies, 14 reported success in achieving reduced children's ETS exposure between intervention and control groups, six with biochemical or environmental measures of children's ETS exposure (biological verification of cotinine in urine or saliva of child, or environmental monitors) (Wahlgren 1997; Emmons 2001; Kimata 2004; Borrelli 2010; Baheiraei 2011; Prokhorov 2013) and eight without such measures (Zhang 1993; Armstrong 2000;

Curry 2003; Abdullah 2005; Schonberger 2005; Yilmaz 2006; French 2007; Phillips 2012). Of these, eight were judged to be at high risk of bias, two at low risk of bias, and four at unclear risk of bias. A brief summary of outcomes can be found below, with further details of outcome measures in the section Analysis 1.1.

Of the six studies with biochemical or environmental measures of children's ETS exposure, two reported urinary cotinine measures in children, and four recorded household air nicotine with monitors. Three of these six studies used motivational interviewing techniques, one used intensive counselling, one used "fotonovelas" and a comic book, and in one the intervention was described only as parents agreeing to stop smoking. Following an intensive counselling intervention, Wahlgren 1997 reported parental reduction of 1.1 cigarettes per day smoked in the presence of the children for the control group, and 2.2 cigarettes per day for the intervention group; a greater reduction had occurred prior to the intervention. There was no validation by measurement of children's exposure or absorption via cotinine, or validation of the parental reports, and the clinical significance of such a fall is unclear. The environmental monitors were placed in one room with the "heaviest exposure" and did not find a significant difference between groups. Kimata 2004 achieved a reduction in urinary cotinine levels in children in the cessation group compared to the controls at one month of 285±43 $ngmL^{-1}$ to 2.2±0.85 $ngmL^{-1}$ in atopic eczema/dermatitis (AEDS) cessation group, 257±31 $ngmL^{-1}$ to 1.8±52 $ngmL^{-1}$ in normal child cessation group and 274±42 $ngmL^{-1}$ vs 298±52 $ngmL^{-1}$ in control group of children with AED. As the intervention in this study is explained only as parents agreeing to stop smoking, more information is needed to determine the applicability and transferability of the study to other settings. Baheiraei 2011 used motivational interviewing and reported geometric mean urinary cotinine: for the intervention group this decreased from 48.72ng/mg to 28.68ng/mg, and for the control group decreased from 40.43ng/mg to 36.32ng/mg. Emmons 2001, Borrelli 2010 and Prokhorov 2013 used household nicotine as a primary outcome measure, please see Household Air Quality section for further results.

Eight studies reported success based on parents' report of smoking cessation, with or without salivary cotinine verification, or reduction in smoking in the presence of children but without verification of children's ETS exposure. These studies employed a range of interventions ranging from school based interventions (children writing letters to their fathers urging them to quit), intensive counselling, a home visiting programme, education and advice, and an intervention based on the Behavioural Action Model (BAM). Zhang 1993 used a school-based intervention and reported proportion of fathers who quit smoking for at least 180 days as 800/9953 (11.7%) for the intervention group and 14/6274 (0.2%) for the control group. At follow-up, Armstrong 2000 reported smoking in house around infant (maternal self report) for the intervention group as 8.6% and control group as 23.8%, where the intervention group received a home visiting programme. Curry 2003 reported smoking abstinence at 12 months as 13.5% in the intervention group, following a brief motivational message and telephone counselling, and 6.9% in the control group. Abdullah 2005 used telephone counselling and reported a biochemically validated quit rate of 47/444 (10.6%) for the intervention group and 21/459 (4.5%) for the control group at six months. Schonberger 2005 reported 52% (14/27) of postnatal mothers quit smoking in the intervention group, compared to 28% (8/30) in the control group at six months follow-up, where the intervention group received home visits. Yilmaz 2006 had two intervention groups which had discussions about the effect of smoking on child or maternal health. Quit rates at follow-up were: child intervention group 24.3%; mother intervention group 13%; control 0.8%. French 2007 used motivational interviewing and at six month follow-up 26 (22%) of the intervention group and 9 (10%) of the control group were saliva cotinine verified non-smokers. Phillips 2012 used motivational interviewing for both groups, and the intervention group also received information about infant bonding. The study reported that at eight weeks post-partum, there were significantly more smoke-free mothers post-partum in the intervention (81%) compared with the control (46%) group.

Forty-two studies failed to detect an intervention effect on ETS outcomes (Woodward 1987; Hughes 1991; Chilmonczyk 1992; Davis 1992; Vineis 1993; Greenberg 1994; McIntosh 1994; Elder 1996; Eriksen 1996; Severson 1997; Irvine 1999; Groner 2000; Hovell 2000; Van't Hof 2000; Ratner 2001; Wilson 2001; Hovell 2002; Pulley 2002; Wakefield 2002; Conway 2004; Fossum 2004; Zakarian 2004; Chan 2005; Krieger 2005; Wiggins 2005; Chan 2006a; Kallio 2006; Nuesslein 2006; Culp 2007; Ekerbicer 2007; Ralston 2008; Hannover 2009; Hovell 2009; Winickoff 2010; Butz 2011; Herbert 2011; Wilson 2011; Stotts 2012; Chellini 2013; Patel 2012; Ralston 2013; Tyc 2013). In two of these studies based on intensive counselling there was significant reduction in self reported parental smoking without a corresponding reduction in children's urinary cotinine measurements (Hovell 2000; Hovell 2009). Halterman 2011 only measured child health outcomes. In Culp 2007 the intervention group received home visits, and whilst there was no significant reduction in smoking, the other outcome of relevance to our review was mothers' knowledge of the effects of smoking on child development. At 12 months, 2 out of 6 questions were answered better by the intervention group.

In all, 14 of these 42 studies used biochemical measures of children's ETS exposure (child urinary or salivary cotinine levels) while the rest used self reports of smoking behaviour, with or without salivary cotinine verification. Interventions used in these studies were varied, 14 used more intensive counselling approaches, including four that used motivational interviewing. Other interventions included brief advice or counselling (nine studies), feedback of a biological measure of children's ETS exposure (six studies), feedback of maternal cotinine (one study), telephone smoking cessation advice or support (two studies), educational home visits (eight studies), group sessions (one study), an information kit and

letter (one study), a booklet and no smoking sign (one study), and school based policy and health promotion (one study). Some studies employed more than one intervention.

Household air quality

Five studies reported household air nicotine as a primary outcome measure (Emmons 2001; Borrelli 2010; Butz 2011; Stotts 2012; Prokhorov 2013). Emmons 2001 used motivational interviewing and telephone counselling, and reported reduced household air nicotine measurements over time in the intervention groups. As there was no change in the number of cigarettes per day smoked, nor in the cessation rate, the implication of the difference was that parents and carers had changed smoking location and had moved outside to smoke. Borrelli 2010 reported a significant decrease in nicotine concentrations as measured by home monitors in the BAM (intervention to increase self-efficacy) but not PAM (motivational interviewing) group at 3 month follow-up. Butz 2011 had three groups which all received asthma education: one group received air cleaners, another group received air cleaners and a health coach, and a control group. They combined results of both intervention groups, who received air cleaners, and compared air quality with the control group. The results suggested that the intervention groups had significantly lower mean particulate matter concentrations compared to the control group. There were no significant differences in air nicotine levels. Stotts 2012 used motivational interviewing, and found no significant differences in environmental nicotine monitors between groups. Prokhorov 2013 reported a significant decrease in nicotine concentrations for the intervention group,which received a comic book and "fotonovelas" for the "high exposure" room but not the "low exposure" room, whilst the decrease in the control group was not significant.

Child health outcomes

Fourteen studies explicitly aimed to improve child health outcomes (Hughes 1991; Greenberg 1994; Armstrong 2000; Wilson 2001; Pulley 2002; Kimata 2004; Krieger 2005; Schonberger 2005; Wiggins 2005; Culp 2007; Borrelli 2010; Butz 2011; Halterman 2011; Wilson 2011) and a fifteenth (Wahlgren 1997) measured child health outcomes although they were not a primary outcome variable (see Analysis 1.1). Of these, in the majority (nine studies), the child health outcome of interest was asthma related (symptom scores, quality of life, functional morbidity, symptom free days, and asthma related health services utilisation). In two studies, the health outcome of interest was respiratory illnesses and another two reported health service utilisation alone, community services in one and hospital admissions and emergency visits in another. One study measured a change in neurotrophin levels though which neurotrophins were measured is not specified.

Nine studies found improvement in child health outcomes. Hughes 1991 embedded an intervention to reduce children's ETS exposure in a study of a comprehensive asthma education intervention. The outcome was improved asthma control but no change in exposure to ETS. Greenberg 1994 targeted ETS exposure in infants less than six months of age, and aimed to reduce the incidence of lower respiratory tract illness and the prevalence of respiratory symptoms. For infants of smoking mothers it demonstrated a lower prevalence of persistent symptoms in the intervention group (17.8%) compared with control group (30.9%; risk difference 13.1%; 95% CI: 1.0 to 27.0%). There was no difference in the incidence of illness. Wilson 2001 examined the effect of an intervention targeting smoking behaviour change and asthma education on health care utilisation and asthma hospitalisations, and explored other measures of asthma control. It demonstrated a reduction in the prevalence of children making more than one acute care asthma visit in the year following the intervention. Given that there was no apparent benefit of the smoking-related counselling on smoking related outcomes, it is likely that it was the asthma education that achieved the improvement in asthma morbidity, rather than the smoking behaviour programme. Kimata 2004 found that cessation of smoking had no effect on the skin wheal responses or plasma neurotrophins in normal children, but achieved a significant reduction in skin wheal response, responses to house dust mite, cat dander and lower neutrophil levels for those with atopic eczema/dermatitis syndrome. Neurotrophins are a subset of growth factors with a range of functions throughout the body and include nerve growth factor and brain-derived neurotrophic factor (Lackie 1999). This was the only study identified by this review to consider neurotophin levels, and it does not specify which particular neurotrophins were measured. Krieger 2005 delivered a community home intervention to address conditions affecting childhood asthma, and reported that the high-intensity intervention group had a clinically significant improvement in paediatric caregiver asthma quality-of-life score and a decline in urgent health service utilisation, but no significant difference in symptom-free days, compared to the low-intensity intervention group. However, they did not achieve a statistically significant intervention effect for carer report of smoking in the home or report of no smoking allowed in the home, so child health intervention effect is probably due to other aspects of the intervention. Culp 2007 conducted home-visits with the goal of promoting the health and development of first-time mothers and infants, and found that there were no significant differences between groups on number of hospital admissions or emergency room visits. At 12 months, intervention mothers were more likely to make use of health department clinics for well child care as compared to control group ($p = 0.04$). Borrelli 2010 reported that the child's level of functional morbidity due to asthma decreased significantly ($p<.001$) in both the BAM (intervention to increase self-efficacy) and PAM (motivational interviewing) groups over time. Butz 2011 reported that after combining the two group that used air cleaners, children assigned to those groups had a significant increase in symptom-free days during the past 2 weeks; 1.36 compared with 0.24 symp-

toms-free days for control group children from baseline to follow-up. Halterman 2011 used motivational interviewing to counsel the primary caregiver and an additional smoker who spends the most time with the child, with observed inhaler administration at school by nurse. The study only measured child health outcomes and found a significant improvement in many asthma-related outcome measures in the intervention compared to the control group. Further details can be found in the Analysis 1.1 table.

Five studies did not detect a significant intervention effect on child health outcomes (Wahlgren 1997; Armstrong 2000; Pulley 2002; Wiggins 2005; Wilson 2011). See Analysis 1.1 for more details. Armstrong 2000 used a broader intervention which included education about smoking near infants as a Sudden Infant Death Syndrome (SIDS) prevention strategy in a post-natal nurse home visiting programme aimed to improve the quality of maternal-child attachment, maternal health and child health parameters. At 12 months there was no statistically significant difference between the groups for immunization status or for rates of utilisation of community services. Of the other four studies, two used home visits and two used more intensive counselling methods (one of which included cotinine feedback).

Schonberger 2005 reported associations of exposure to passive smoking with parentally reported asthma symptoms without group allocation. It is therefore not possible to determine an intervention effect on child health outcomes.

Results according to child age

A similar proportion of studies in each age bracket detected intervention effects. Four of the twenty studies which examined measures to reduce ETS exclusively for infants detected an intervention effect (Abdullah 2005; Baheiraei 2011; French 2007; Phillips 2012). Two of the eight studies examining measures to reduce ETS for children up to and including preschool age demonstrated an intervention effect (Emmons 2001; Schonberger 2005). Nine of the 24 studies examining measures to reduce ETS for children up to and including school age and older demonstrated an intervention effect (Zhang 1993; Greenberg 1994; Wahlgren 1997; Kimata 2004; Krieger 2005; Yilmaz 2006; Borrelli 2010; Halterman 2011; Prokhorov 2013).

Results according to setting

In the 'ill child' respiratory setting, four of 13 studies demonstrated an intervention effect (Wahlgren 1997; Krieger 2005; Borrelli 2010; Halterman 2011). Krieger 2005 and Halterman 2011 showed a significant effect on child health outcomes but not on tobacco smoke exposure outcomes. Three of these four studies used intensive counselling or motivational interviewing, whilst one used a community home intervention with elements of education and behaviour change. Of the nine studies that did not demonstrate an intervention effect, three used intensive counselling, one used motivational interviewing, one used a motivational health coach in addition to air cleaners, two used brief counselling methods and two used home visits.

In the 'ill child' non-respiratory setting, two of eleven studies showed an intervention effect (Kimata 2004; Phillips 2012). For Kimata 2004 the intervention was not described, whilst Phillips 2012 used motivational interviewing for both groups, and the intervention group also received information about infant bonding. Of the nine studies that did not demonstrate an intervention effect, three used brief counselling methods, four used more intensive counselling, including one study that used motivational interviewing, one used a booklet and one used cotinine feedback.

In the clinical setting (not designated 'well child' or 'ill child'), one study out of two demonstrated an intervention effect (Curry 2003). This study used a brief motivational message and motivational interview, with follow-up telephone counselling. Nuesslein 2006 did not find an intervention effect, and used parental cotinine feedback.

In the clinical setting (both 'well child' and 'ill child') Yilmaz 2006 demonstrated an intervention effect, with smoking cessation interventions aimed at the child or mother's health. There were no other studies in this group.

In the 'well child' clinical setting, six of the twenty-three studies demonstrated an intervention effect (Armstrong 2000; Emmons 2001; Abdullah 2005; Schonberger 2005; French 2007; Baheiraei 2011). Three of these six studies used motivational interviewing, two used home visiting interventions and one used telephone smoking cessation counselling. Of the 17 studies that did not demonstrate an intervention effect, five used brief counselling methods, five used intensive counselling methods, including one that used motivational interviewing, four used home visits, one used cotinine feedback, one used telephone counselling and one used an information kit and letter.

In the community setting, two of the seven studies showed an intervention effect (Zhang 1993; Prokhorov 2013). Zhang 1993 was one of four studies in a school setting. Prokhorov 2013 used fotonovelas and a comic book for their intervention group. Of the five studies that did not demonstrate an intervention effect, two used telephone counselling, two were school-based, and one used group sessions.

Benefit among participants in comparison groups: A possible 'study effect'

In 32 of the 57 studies, there was reduced children's ETS exposure for study participants regardless of assignment to intervention or control groups (Woodward 1987; Hughes 1991; Davis 1992; Vineis 1993; Elder 1996; Eriksen 1996; Severson 1997; Wahlgren 1997; Irvine 1999; Groner 2000; Ratner 2001; Wilson 2001; Hovell 2002; Wakefield 2002; Curry 2003; Fossum 2004; Abdullah 2005; Chan 2005; Krieger 2005; Chan 2006a; Kallio 2006; Nuesslein 2006; Ekerbicer 2007; Hovell 2009; Winickoff

2010; Halterman 2011; Herbert 2011; Wilson 2011; Chellini 2013; Prokhorov 2013; Ralston 2013; Tyc 2013).

Biological validation of parents' self report

Of the 20 studies with biological evidence of child ETS absorption, 12 allowed an assessment of validation of parent-reported change in exposure versus child ETS absorption (Greenberg 1994; McIntosh 1994; Hovell 2000; Wilson 2001; Hovell 2002; Wakefield 2002; Kimata 2004; Zakarian 2004; Kallio 2006; Hovell 2009; Baheiraei 2011; Tyc 2013). Of these studies, four did not show a discrepancy between reported exposure and an objective measure of absorption (Wilson 2001; Wakefield 2002; Kimata 2004; Kallio 2006). Kallio 2006 reported that parent serum cotinine values showed that parents reported smoking habits accurately but did not provide data. Of the studies using environmental monitors of child exposure to ETS, Wahlgren 1997 and Hovell 2009 allowed an assessment of validation of parent-reported change in exposure versus objective measure. Wahlgren 1997 did not demonstrate a correlation between parental report and environmental monitoring, whilst Hovell 2009 reported a significant moderate correlation. For Hovell 2009 however, the results showed a significant reduction in child secondhand smoke exposure associated with the intervention according to reports, but not according to child urinary cotinine. Tyc 2013 also noted a significant decrease in reported child secondhand smoke exposure but not in child urinary cotinine in the intervention group. Borrelli 2010 noted that, according to monitors in the home, but not on the child, there was a significantly greater reduction in exposure to children in the BAM (intervention to increase self-efficacy) group, although there were a higher quit rates in the PAM (motivational interviewing) group. This was thought to have occurred due to a greater change in the number of cigarettes smoked in front of the child in the BAM group, rather than considering the monitors as a validation measure.

Cost data and cost effectiveness

Twelve of the studies made some reference to costs. However this was generally limited to some statement of implementation costs; McIntosh 1994 mentioned the cost of the manual and Severson 1997 mentioned the staff and intervention cost per person of the intervention. Conway 2004 and Wiggins 2005 also mentioned the costs of implementing the intervention but indicated that further analysis of cost effectiveness was not conducted due the lack of intervention effect. Krieger 2005 reported reduced urgent healthcare costs during the two months before the exit interview for those receiving the intervention relative to the comparison group, but did not provide an extensive cost benefit analysis.

DISCUSSION

The evidence for success in reducing children's exposure to tobacco smoke is drawn from 14 studies. Seven of these were conducted in or from a clinical setting and employed an intensive counselling-based approach or motivational interviewing (Wahlgren 1997; Emmons 2001; Curry 2003; French 2007; Borrelli 2010; Baheiraei 2011; Phillips 2012). Phillips 2012, however, used motivational interviewing for both groups with additional infant bonding information for the intervention group. While individual studies reported evidence of success for the following types of interventions, further research is needed to confirm their findings: a school-based curriculum-based approach (Zhang 1993); intensive home visiting programme for at-risk mothers that included education about preventive child health (Armstrong 2000); smoking cessation telephone counselling to mothers recruited through 'well child' clinics (Abdullah 2005); the provision of brief educational information to parents of sick children in a clinical setting (Schonberger 2005); education provided by nurses to mothers attending 'well child' visits about the impact of smoking on either their own or their child's health (Yilmaz 2006); and culturally sensitive "fotonovelas" and a comic book (Prokhorov 2013). A further successful study only reported that parents agreed to stop smoking, and does not describe further detail (Kimata 2004). The remaining studies which demonstrated no evidence of intervention effect on reducing children's exposure to tobacco smoke were also conducted in clinical and community settings. Halterman 2011 found a significant improvement in asthma related outcomes in the intervention group, using observed medication administration and motivational interviewing regarding environmental tobacco smoke.

Of the 42 studies that did not find an intervention effect to reduce children's ETS exposure: 14 used more intensive counselling approaches, including 4 that used motivational interviewing. Other interventions included brief advice or counselling (9 studies), feedback of a biological measure of children's ETS exposure (6 studies), feedback of maternal cotinine (1 study), telephone smoking cessation advice or support (2 studies), educational home visits (8 studies), group sessions (1 study), an information kit and letter (1 study), a booklet and no smoking sign (1 study), and school based policy and health promotion (1 study). Some studies employed more than one intervention.

There is no clear evidence of success in reducing children's exposure to tobacco within various clinical settings: respiratory settings (four of the thirteen were successful); non-respiratory 'ill child' (two of eleven); non-peripartum 'well child' (two of ten); and peripartum 'well child' (four of thirteen) settings. In the community setting, two of the seven studies were successful (one of which was a school-based interventions). Three of the eight studies which focused primarily on change in participants' attitudes and behaviours rather than knowledge were among the more successful interventions.

Strategies which are effective in the adult healthcare setting may

not be generalisable to the paediatric setting. Brief advice for adult smokers when they attend clinical services for their health has a positive effect in triggering quit attempts (Stead 2008). This effect was not detected in the trials of interventions for parents attending clinical paediatric or child health services. However, this finding might also suggest that either a different sort of brief intervention should be employed or that this context should not be used for brief advice. It is also possible that the studies were underpowered to detect a small effect. Examination of the dynamics of the doctor-child-parent relationship may assist the development of brief strategies with a greater likelihood of success in this clinical setting. Given that there are unknowns about the doctor-child-parent interaction there is potential for interventions in this setting to cause harm. One study found a trend for mothers in the intervention group to smoke more than controls after the intervention (Irvine 1999). Several studies used only one-tailed t-tests to look for statistical significance. Where there is potential to cause harm, even if the hypothesis is unidirectional, two-tailed tests of significance should always be employed. Hovell 2009 undertook a regression analysis to examine the factors associated with the longest participant smoking quit attempts following counselling. The odds for the longest quit attempt were significantly increased when the participants had made a 24 hour quit attempt in the year prior to baseline, had tried a greater number of methods to quit in the past, and had reduced permissiveness of home smoking. Significant associations were not found between longer quit attempts and level of education, heaviness of smoking or the smoking status of the partner.

There is insufficient evidence of the effects on child health indicators of efforts to change child exposure to ETS. Where studies showed a beneficial effect on child health outcomes this could not always be related to an intervention aiming to reduce children's exposure to ETS (e.g. Culp 2007, Halterman 2011) as there might have been a range of interventions in addition to an intervention to reduce children's ETS exposure or there may have been a change in measured health outcomes without a corresponding change in ETS exposure outcomes.

There are major differences between those studies which aim to reduce children's exposure to ETS while potentially leaving parental smoking levels unchanged, and those studies which aim to encourage parents to stop or to reduce smoking. A third category may be studies which aim to encourage parents to stop or to reduce smoking, but qualify this with a compromise position of reducing children's exposure to ETS if parents do not cut down or quit. Any interventions which reduce children's exposure are beneficial for the child, although they still expose children to the harm of an increased risk of smoking themselves in adolescence. They also do nothing to improve health outcomes for parents.

There are relatively high rates of smoking cessation in pregnancy, both spontaneously and with clinical interventions (Lumley 2009). With high relapse rates postnatally among women who have quit in pregnancy (Lelong 2001), prevention of relapse for this group is an obvious means of preventing ETS exposure for their children. Of five studies examining an intervention to prevent smoking relapse postpartum, two (French 2007; Phillips 2012) showed a significant beneficial effect for reducing relapse. Ratner 2001 and Van't Hof 2000 identified risk factors for relapse. Risk factors identified by Ratner 2001 were having a partner who smoked and a higher number of sticks smoked per day prior to quitting, whilst prolonging breast feeding and a higher score on a scale measuring "mental health" were protective. Van't Hof 2000 found that a lower level of confidence to maintain cessation, a lower level of family and friends' encouragement to maintain cessation and a higher number of family and friends who smoked were all associated with significantly higher odds of relapse postpartum. Further work in this area will make an important contribution.

Overall, 32 of the 57 studies demonstrated reduced child exposure to ETS for participants, regardless of assignment to intervention or control groups, which suggests that the studies may be describing the natural history of smoking among parents. Parents may reduce their own smoking or their children's exposure over time, possibly as a result of social pressures. Indeed the prevalent social trend in many developed countries over the last decade has been of increasing community concern about exposing nonsmokers to ETS (although arguably more so among nonsmokers than among active smokers).This is especially true for adults in the workplace and public spaces such as bars and restaurants, particularly in North America, Australia and some countries within the EU, where total smoking bans for these settings are increasingly being legislated. Campaigns and community concern about children's exposure to ETS at home and in cars has also increased. It is possible that these studies have recorded parents responding to this social trend by limiting their children's exposure in the home. This being the case, studies need to aim not just for a reduction in children's ETS exposure, but for a greater than background reduction in ETS exposure. In order for a study to produce a significant effect, the impact of interventions must be greater than the comparison groups' rate of decline. It may also be that as most studies used comparison groups rather than control groups (i.e. no cessation or avoidance advice and no information), the comparison interventions may have been more effective than anticipated. As the studies have generally involved comparison groups receiving a limited intervention rather than being strict control groups, this is certainly possible. Moreover, measurement of tobacco smoke exposure outcomes alone may produce an intervention effect and thus be an important component of any intervention.

Limitations of methods employed

Parent reports and reliability

Of the 20 studies which used objective measures of children's ETS exposure or absorption, four showed no discrepancy between

parental report of children's exposure and the biological measure. Achieving parental or carer smoking cessation would result in reductions in ETS exposure for the child, in addition to obvious benefits for the ex-smoker. The child harm minimisation approach in this context aims to change adult smoking location or amount, but does not aim for cessation. There is insufficient evidence to comment on whether the parental or carer cessation approach, or the child harm minimisation, is the strategy most likely to lead to reduction of children's ETS exposure. If they were equally effective, adult cessation would be the preferable strategy, because of the benefits to the adult, as well as elimination of the negative role modelling associated with smoking, and would therefore be the preferable strategy.

Small sample sizes

Many of the included studies had small sample sizes, and only half of studies (n = 28) studies reported a power calculation. This results in difficulty establishing whether the intervention did not appear to reduce children's ETS exposure as the sample size was too small. The heterogeneity of study designs and characteristics has rendered quantitative analysis inappropriate in this review.

Length of follow-up

The included studies had varying length of follow-up and we used the longest reported follow-up for the results. Some studies did, however, have short lengths of follow-up with 20 studies reporting a follow-up of less than six months. It is difficult to determine the sustainability and long-term effectiveness of interventions where the study follow-up is short. Indeed, of the studies with longer follow-up, some did show an initial difference between intervention and control group that was not sustained at the final follow-up period.

AUTHORS' CONCLUSIONS

Implications for practice

- There is currently insufficient evidence to recommend one strategy over another to reduce the prevalence or level of children's environmental tobacco smoke exposure.

- There is no clear evidence of success within different settings, including 'well child', 'ill child' and community contexts.

- There is limited support for more intensive counselling interventions delivered to parent(s).

Implications for research

- Given the potential for bias in parental report of children's ETS exposure, future studies should use biochemical verification of children's exposure to or absorption of ETS.

- Studies with larger sample sizes are also recommended, to adequately explore the effects of interventions of family and carer interventions to reduce children's exposure to ETS.

- Interventions should be designed and powered with consideration of reduction in children's ETS exposure that occurs in comparison groups and in the wider community.

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* *Indicates the major publication for the study*

CHARACTERISTICS OF STUDIES

Characteristics of included studies *[ordered by study ID]*

Abdullah 2005

Methods	Country: Hong Kong, China Setting: Community (maternal and child health centres) Type: RCT
Participants	952 parents from a birth cohort who were listed as smokers in the '1997 Birth Cohort Study' of the Department of Community Medicine, University of Hong Kong
Interventions	Intervention: 20-30 minutes of telephone counselling with information based on the individuals needs; no NRT information given unless asked and even still information given was kept minimal. Stage-based printed self-help materials (based on baseline) provided just once. Control: Recieved stage-based printed self-help material only
Outcomes	At 6 months. Parental quitting: Self reported 7 day prevalence quit rate, Self reported 24h point prevalence quit rate, Self reported continuous abstinence rate, Bio-chemically validated (either CO or urine cotinine or both) quit rate. Reported implementation of total or partial smoking ban at home
Type of intervention	2. 'Well child' (child health check)
Notes	Retention: 837/952

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	Randomized, method not described
Allocation concealment (selection bias)	Low risk	Numbered sealed opaque envelopes
Incomplete outcome data (attrition bias) All outcomes	Low risk	Losses to follow up 11% intervention/ 4% control. Included as continuing smokers
Blinding of outcome assessment (detection bias) All outcomes	Low risk	"Independent interviewer...was unaware of subjects' group allocation... All respondents who reported they were not smoking during the preceding 7 days were invited to attend the research centre for biochemical validation."

Armstrong 2000

Methods	Country: Australia Setting: Community (Child health nurse home visits) Type: RCT
Participants	181 women recruited from a post-natal ward who had given birth to a single live infant, identified as 'at risk' (1or more of identified physical domestic violence, identified childhood abuse of either parent, sole parenthood or ambivalence to pregnancy as well as 3 or more of maternal age <18 years, unstable housing, financial stress, poor maternal education, low family income, social isolation, history of mental health disorder, drug or alcohol abuse and domestic violence other than physical abuse)
Interventions	Intervention: Home-based intervention focused on establishing trust with families, enhancing parenting self esteem and confidence, guidance for child development including crying and sleep behaviour, promoting preventive child health care and facilitating access to child health centres. Weekly home nurse visits for first 6 weeks, fortnightly for 3 months and then monthly until 6 months post partum. Control:Usual care.
Outcomes	At 4 months. Health outcomes only reported at 12 months. Maternal self report of smoking behaviour and observations by research assistants of smoking behaviour in the home Child health questionnaire
Type of intervention	2. 'Well child' (peripartum)
Notes	

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Low risk	"A random number table was computer generated"
Allocation concealment (selection bias)	Low risk	The random number table was "used by a clerical officer not involved in determining eligibility to determine intervention status"
Incomplete outcome data (attrition bias) All outcomes	Low risk	Similar rates of retention at 12m in both arms (76% intervention, 77% control)
Blinding of outcome assessment (detection bias) All outcomes	Low risk	"Data were collected in the home by a researcher who was naive to the intervention status of the participants and was not involved in providing healthcare to the participants."

Baheiraei 2011

Methods	Country: Iran Setting: Recruited from health centres, intervention face-to-face/on phone RCT
Participants	130 families with healthy infants aged less than 12 months
Interventions	Intervention: Counseling (motivational interviewing) of mothers and fathers Control: Usual care (health visits for checking the infant's growth and developmental milestones) Parents also given a pamphlet and sticker depicting a smoke-free home
Outcomes	Infant urinary cotinine at baseline and three months Change in parental smoking Home and car smoking bans
Type of intervention	2. 'Well child' (child health check)
Notes	

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Unclear risk	No information provided
Allocation concealment (selection bias)	Unclear risk	No information provided
Incomplete outcome data (attrition bias) All outcomes	Low risk	4/65 lost to follow up in control group and 5/65 in intervention group
Blinding of outcome assessment (detection bias) All outcomes	Low risk	The statistical analyst and outcome assessors were blinded to the group assignment, the control group was uninformed of the counselling processes

Borrelli 2010

Methods	Country: USA Setting: Recruited from number of sites including hospital inpatients and clinics, Latino cultural events. Intervention involved counselling visits and phone calls RCT
Participants	Latino caregivers who smoked and had a child with asthma
Interventions	Group1: Behavioral action model (BAM). This was modelled on clinical guidelines for smoking cessation. The model focused on increasing the smoker's self-efficacy to quit through teaching problem solving and coping skills

	Group 2: Precaution adoption model (PAM) This used feedback on the caregiver's carbon monoxide level and child's secondhand smoke exposure, using motivational interviewing techniques Eight weeks of transdermal nicotine patches available free of charge if the participants were ready to quit
Outcomes	Passive nicotine monitors at baseline and at 3 months after the end for treatment Level of functional morbidity due to asthma Smoking cessation by caregiver; self-report and expired air CO concentration (continuous abstinence, seven-day point prevalence abstinence)
Type of intervention	3. Child with health problems (respiratory disorders)
Notes	Attrtion 37/133

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Low risk	Randomised by computer generated sequence
Allocation concealment (selection bias)	Unclear risk	No information provided
Incomplete outcome data (attrition bias) All outcomes	High risk	Attrtion 37/133
Other bias	High risk	Selection bias. Some participants were enrolled from other studies so it may be difficult to elicit study specific effects. Inconsistencies in presentation of data: BAM group (n=68) had results for n=49 at the end of the study, and not all accounted for. Similarly in the PAM group n=65 and completed n=49 at end of treatment and not all accounted for. Outcomes presented for 'acculturation' and 'asthma morbidity' but no details on how these were assessed
Blinding of outcome assessment (detection bias) All outcomes	Low risk	Self-report assessments administered by research assistants blind to treatment condition. Self-report assessments administered by research assistants blind to treatment condition

Butz 2011

Methods	Country: USA Setting: Hospital and home RCT (three arms)
Participants	Inner-city families with a child aged 6 to 12 years with asthma, residing with a smoker
Interventions	Health coach/air clear group: Two air cleaners and four 30 to 45 minute nurse health coach home visits, and a behavioral intervention to reduce child second-hand smoke exposure Air cleaner group: Two air cleaners and four asthma education sessions Control group: Asthma education during four nurse home visits
Outcomes	Six month follow-up from baseline Child urinary cotinine at baseline and six month follow-up Asthma symptom-free days Acute asthma health care events Change in air quality Caregiver smoking frequency and location
Type of intervention	3. Child with health problems (respiratory disorders)
Notes	

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Low risk	Randomised in 1:1:1 ratio with random block sizes, randomisation performed by study coordinator using the function in the database
Allocation concealment (selection bias)	Low risk	All study staff, including all investigators, were blinded to subsequent group assignment
Incomplete outcome data (attrition bias) All outcomes	Low risk	91.3% followed up
Other bias	High risk	Children randomized to the control group had caregivers who smoked significantly more at baseline and follow-up than either intervention group
Blinding of outcome assessment (detection bias) All outcomes	Low risk	All study staff, including all investigators, were blinded to subsequent group assignment

Chan 2005

Methods	Country: Hong Kong, China Setting: Hospital (paediatric wards/outpatients) Type: RCT
Participants	80 parents of sick children presenting to a clinic or admitted to a children's ward of a major Hong Kong hospital
Interventions	Intervention: Individualised motivational intervention for 30 minutes with nurse counsellor; appropriate stage-matched intervention was used to 'increase motivation and lower resistance to quit' telephone reminder 1 week after the intervention. Control: Healthy diet counselling for their sick children as a placebo intervention
Outcomes	1 month follow up Parents report of daily cigarette consumption in past 30 days
Type of intervention	3. Child with health problems (ill child health care)
Notes	Retention: 77/80

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	"Randomized controlled trial," no further information provided
Allocation concealment (selection bias)	Unclear risk	Randomized after completing questionnaire, no further information provided
Incomplete outcome data (attrition bias) All outcomes	Low risk	Low loss to follow-up: 77 (out of 80) participants followed-up successfully
Blinding of outcome assessment (detection bias) All outcomes	Unclear risk	"At 1 month, trained interviewers who were blinded to the group assignment delivered telephone follow-up calls to both groups to evaluate the primary and secondary outcomes using a standardized questionnaire." Self-reported outcome only, bias possible

Chan 2006a

Methods	Country: Hong Kong, China Setting: Hospital (paediatric wards and outpatient departments) RCT
Participants	1483 Mothers of sick children admitted to the ward or attending the outpatient department from all the participating trial centres November 1997 - September 1998

Chan 2006a (*Continued*)

Interventions	Intervention: Mothers received information from nurses including standardized health advice, booklet about preventing child exposure to passive smoking, booklet to give to fathers on quitting smoking, a no smoking sign to place in the home to remind the father not to smoke and a telephone reminder 1 week later. Control: Normal care by nurses.
Outcomes	3, 6 and 12 month follow up. Mother self-reports actions taken to reduce child passive smoke exposure
Type of intervention	3. Child with health problems (ill child health care)
Notes	Retention: 1273/1483 (86%)

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Low risk	"Random numbers were generated by the investigator using the computer and assigned to intervention (even) and control (odd) groups."
Allocation concealment (selection bias)	Low risk	"Nurses then randomized the subjects into the intervention or control group by opening a sealed envelope with serial numbers."
Incomplete outcome data (attrition bias) All outcomes	Low risk	Low loss to follow-up, ITT analysis used, similar percentage lost in both groups. 86% intervention and 85% control retention
Other bias	High risk	Contatmination of the control group possible: open ward setting, "the mothers in the control group could have by chance read the health education booklet from the mothers in the intervention group... furthermore, the nurses' health education could be easily overheard."
Blinding of outcome assessment (detection bias) All outcomes	Low risk	Self report only, differential misreport possible, but no difference found between groups, so unlikely

Chellini 2013

Methods	Country: Tuscany, Itlay Setting: Well child, in the community RCT
Participants	218 women 30-49 years of age with children
Interventions	Brief counselling and three gifts. Both groups received self-help booklet
Outcomes	Reported smoking restrictions in the home and car Change of smoking status reported
Type of intervention	2. 'Well child' (child health check)
Notes	

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	Random number table used
Allocation concealment (selection bias)	Unclear risk	Not stated
Incomplete outcome data (attrition bias) All outcomes	Low risk	12 of 218 lost to follow up and ITT analysis performed
Blinding of outcome assessment (detection bias) All outcomes	Unclear risk	Not discussed for observer, objective measure not used

Chilmonczyk 1992

Methods	Country: USA Setting: Well baby check RCT.
Participants	103 mothers smoking >=10 cigarettes/day with infants presenting to a well baby check
Interventions	Urine was collected from all infants and analysed for cotinine. Intervention: a report of infants' urinary cotinine level with a personalised letter to the mother to be signed were returned to the child's doctor. The letter outlined ways to reduce child ETS exposure (location of smoking, washing hands after smoking, ensure day care home is smoke-free, ask friends to avoid smoking in the presence of the infant when visiting) but did not discuss cessation. The physician called the mother by telephone to further explain the results. Control: Usual care

Chilmonczyk 1992 (*Continued*)

Outcomes	At 2 months all participants were contacted to obtain a second urine sample from the infant for analysis	
Type of intervention	2. 'Well child' (child health check)	
Notes	Retention: 56/103 (54%)	
Risk of bias		
Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Low risk	"randomly assigned by computer on an individual basis to intervention or control groups"
Allocation concealment (selection bias)	Low risk	See above.
Incomplete outcome data (attrition bias) All outcomes	Low risk	High loss to follow up - 43% control and 48% intervention, "however, it is unlikely that exclusion bias would mask a true impact of the intervention. Characteristics of those who complied were similar to those of the noncompliers... even with the reduced participation... the data were adequate to indicate that the response to the intervention was poor."
Blinding of outcome assessment (detection bias) All outcomes	Low risk	Outcome biochemically verified

Conway 2004

Methods	Country: USA Setting: Community RCT
Participants	143 Latino parents of children aged 1-9 who reported smoking at least 6 cigarettes a week
Interventions	Intervention: 6 home and telephone sessions over a 4 month period delivered by lay trained bicultural and bilingual Latina community health workers. Focused on problem solving aimed at lowering target child's exposure to ETS in the household. Intervention methods included contracting, shaping, positive reinforcement, problem solving, and social support to assist families in achieving their ETS goals. Control: Survey completion only.

Conway 2004 (*Continued*)

Outcomes	3 and 12 month follow up. Child hair nicotine and cotinine. Parent report of child's past month exposure from all sources in the household over last 30 days as measured by number of cigarettes. Confirmed reduction based on both parents' reports and children's hair biomarkers
Type of intervention	1. Community-based
Notes	Retention: 127/143 (89%)

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Unclear risk	"randomized," no further details given
Allocation concealment (selection bias)	Unclear risk	Not specified
Incomplete outcome data (attrition bias) All outcomes	Low risk	81% provided data at all assessments, "and analyses showed attrition introduced no significant biases"
Blinding of outcome assessment (detection bias) All outcomes	Low risk	Biochemical validation used

Culp 2007

Methods	Country: USA Setting: Home Quasi-experimental controlled study
Participants	Pregnant women in rural counties (first time mothers) with follow-up until the child was 12 months
Interventions	Intervention: Home-visits with the goal of promoting the health and development of first-time mothers and infants (The Community-Based Family Resource and Support (CBFRS) Program). The programme had three main foci: maternal health, child health and safety and family functioning and parenting. Child's exposure to ETS was one part of this intervention Control: Received standard health department services that did not include home visits
Outcomes	Mother's reported number of cigarettes smoker per day at baseline, and when infant aged 6 and 12 months Number of hospital admissions emergency room visits, and visiting the health department clinics for well child care

	Knowledge: Mother asked a set of 6 questions about the effect of smoking on her child's growth and development
Type of intervention	2. 'Well child' (peripartum)
Notes	Part of a wider intervention federally funded programme which also included a number of interventions unrelated to ETS

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Unclear risk	Not applicable
Allocation concealment (selection bias)	Unclear risk	Not applicable
Incomplete outcome data (attrition bias) All outcomes	High risk	Overall dropout from analysis rate was fairly low (26%), but drop-out rate was higher in the control group (drop out 49/205 intervention group, 43/150 in control group). Characteristics of drop-outs as a whole are described. No intention-to-treat analysis was carried out. Under these circumstances attrition bias is certainly possible
Other bias	High risk	Not an RCT so very open to selection bias - significant difference in number of years of education between groups. Not much baseline questionnaire info provided so unclear if e.g. knowledge re smoking differed from the start between the two groups
Blinding of outcome assessment (detection bias) All outcomes	High risk	Outcome assessed at interview by research staff who were independent of the intervention staff. However, outcome assessors could very likely have been aware of which group participants were in, as this was decided geographically, and blinding is not mentioned. The paper found a positive intervention effect

Curry 2003

Methods	Country: USA Setting:Paediatric clinics serving ethnically diverse population of low income families RCT
Participants	303 Self-identified women smokers whose children received care at participating clinics
Interventions	Intervention: During clinic visit women received brief motivational message from the child's clinician, a guide to quitting smoking, and a 10 minute interview with a nurse or study interventionist.Women also received as many as 3 outreach telephone counselling calls from the clinic nurse or interventionist in the 3 months following the visit. Control:Usual care
Outcomes	3 and 12 month follow up. Maternal self-reported 7-day abstinence Maternal CO testing
Type of intervention	4. Mixed / not stated
Notes	Retention: 81% at 12 months

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	High risk	Participants "determined their randomization group by choosing a Ping-Pong ball out of a brown paper bag. The bag contained several Ping-Pong balls that were either white or yellow, and the color of the selected ball indicated their study group."
Allocation concealment (selection bias)	High risk	See above
Incomplete outcome data (attrition bias) All outcomes	Low risk	19% lost at final follow-up; counted as smokers. Similar numbers lost to follow-up in both groups
Blinding of outcome assessment (detection bias) All outcomes	Low risk	Biochemical validation used in subset: "We determined the comparability of compliance with testing between the intervention and control groups and then examined the effect on self-reported rates of abstinence of adjusting outcomes by the percentage of abstainers who tested above the cut-off point."

Davis 1992

Methods	Country: USA Setting: Telephone smoking cessation helpline RCT. Randomized by day of week, but counsellors blinded to the guide being used
Participants	630 smoking mothers with children under the age of 6 years calling helpline
Interventions	Callers to a telephone smoking cessation assistance service were randomized to receive one of 3 self help guides. One was specifically written for the target audience, one from the American Lung Association, one developed by the National Cancer Institute. Callers to the line received individual stage-based counselling and were sent the guide by mail
Outcomes	6 months later the participant was called and interviewed for 10 minutes about the use of guide, opinion of the guide, quit attempts and strategies to quit, and current smoking
Type of intervention	1. Community-based
Notes	Retention: 630/ 873 (72%)

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	High risk	Quasi randomized: "Guides were assigned randomly to those in the target audience based on a preassigned list randomized by the day of the week."
Allocation concealment (selection bias)	Low risk	"CIS counsellors were blinded regarding which self-help guides subjects would receive."
Incomplete outcome data (attrition bias) All outcomes	Low risk	28% lost to follow-up, "completion rates were similar for subjects in the three guide groups."
Blinding of outcome assessment (detection bias) All outcomes	Low risk	"Follow-up interviews were conducted by trained interviewers who were blinded regarding subject assignment.... Surrogate interviews were conducted to verify the smoking status of those who reported that they had quit smoking..."

Ekerbicer 2007

Methods	Country: Turkey Setting: School with intervention including telephone calls RCT
Participants	Parents of school children exposed to ETS aged 9 to 11 years attending a private primary school
Interventions	Group one: Parents interviewed by a psychologist trained in smoking addiction Group two: Parents informed of child's urinary cotinine result through a letter
Outcomes	Child urinary cotinine concentrations at nine months from baseline
Type of intervention	1. Community-based
Notes	

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	Participants were "randomly assigned" but method not described
Allocation concealment (selection bias)	Unclear risk	No information provided
Incomplete outcome data (attrition bias) All outcomes	Low risk	Full follow up.
Blinding of outcome assessment (detection bias) All outcomes	Low risk	Biological measure used.

Elder 1996

Methods	Country: USA Setting: Schools RCT. Cluster randomization by school
Participants	96 elementary schools in 4 states
Interventions	Trial of school-based cardiovascular health promotion, including an intervention designed to limit child ETS exposure: Intervention:consisted of promoting the adoption of a formal tobacco-free policy for the school. In addition, there were classroom and home-based programmes for students. Control: schools participated in the evaluation but received no recommendations for policy, classroom or home-based interventions. Control schools were not restricted from taking up tobacco-free policies

Elder 1996 (*Continued*)

Outcomes	At 2 years: School principals (or delegates) were surveyed with respect to their school's policy on tobacco and degree to which the policy was observed	
Type of intervention	1. Community-based	
Notes	Retention: 96/96; this is the CATCH study	
Risk of bias		
Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Unclear risk	"Ten schools at each site were randomly assigned to the control condition and 7 schools each to a school-based intervention (food service, physical education, classroom curricula) or the school-based plus family intervention program," no further information given
Allocation concealment (selection bias)	Unclear risk	Not specified
Incomplete outcome data (attrition bias) All outcomes	Low risk	100% of 3rd grade teachers and 67% of students attended Family Fun Nights; 100% of schools remained in the dietary assessment process
Blinding of outcome assessment (detection bias) All outcomes	Unclear risk	Not specified

Emmons 2001

Methods	Country: USA Setting: family home Type: RCT
Participants	291 smoking parents (or grandparents) living with a child <3 years old, recruited from hospital labour and delivery logs; community health centres and health care providers; self-referral
Interventions	Intervention: received a 30-45min motivational interview at the parent's home with a trained health educator, and 4 follow-up telephone counselling calls (approximately 10min each), aiming to reduce household ETS exposure and increase the smoker's level of readiness for change. Feedback was provided of baseline household air nicotine, parent's CO level and smoking-related respiratory symptoms. Self-help materials targeting ETS reduction and smoking cessation strategies were also provided. Control: self-help materials only; cessation manual, ETS reduction tip sheet, resource guide

Emmons 2001 (*Continued*)

Outcomes	ETS exposure measured by air monitors at baseline and 6 months. Quitting and CPD by parent
Type of intervention	2. 'Well child' (peripartum)
Notes	Retention: 247/291 (85%)

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	"A computer-generated randomization table was used"
Allocation concealment (selection bias)	Low risk	"Randomization information was kept from study staff until the baseline assessment was completed"
Incomplete outcome data (attrition bias) All outcomes	Low risk	ITT analysis used. Similar rates of follow up in both groups: 123/141 control, 124/150 intervention
Blinding of outcome assessment (detection bias) All outcomes	Low risk	ETS exposure measured by air monitors, results did not rely on self-report

Eriksen 1996

Methods	Country: Norway Setting: Health centres RCT
Participants	443 families with one or more smoking parent presenting with a child to a well baby check at 6 weeks, 2 or 4 years
Interventions	Intervention: 5min counselling from health visitor on harmful effects of parent smoking on children and how to prevent it (stop smoking indoors/ in living rooms or quit completely). 3 brochures distributed (harm of passive smoking, measures to prevent passive smoking, self-help cessation manual) and a list of smoking cessation courses. Control: given no information unless participants asked for it, until after the period of study. Physicians were asked to withhold their usual advice. Self-completed questionnaires were administered at the visit and 1 month later
Outcomes	Parent behaviour by self-report at baseline and 1 month.
Type of intervention	2. 'Well child' (child health check)

Eriksen 1996 (*Continued*)

Notes	Retention 363/443 (82%)	
Risk of bias		
Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Unclear risk	"Randomly allocated," method of sequence generation not specified
Allocation concealment (selection bias)	Unclear risk	Not specified
Incomplete outcome data (attrition bias) All outcomes	Low risk	ITT analysis, exact numbers not provided: "the withdrawal was small and probably not intervention related because the proportion of drop-outs was about the same in both groups."
Other bias	Unclear risk	"A "contamination" of information may have taken place from the intervention group to the control group because parents from the two groups may have talked together during the study period."
Blinding of outcome assessment (detection bias) All outcomes	Low risk	Self-report only, no validation used, however no evidence of effect so differential misreport judged to be unlikely

Fossum 2004

Methods	Country: Sweden Setting: Community, Child Health Centres CT
Participants	41 mothers of newborn infants attending participating child health centres
Interventions	Intervention: 'Smoke free children' counselling provided by nurses Control: Usual care
Outcomes	3 months Self-reported smoking habits (number of cigarettes smoked) Maternal cotinine levels
Type of intervention	2. 'Well child' (child health check)
Notes	Retention: 100% for self-report measures. Cotinine follow-up measures: 85% Intervention, 57% Control

Fossum 2004 (*Continued*)

Risk of bias		
Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	High risk	No randomization used
Allocation concealment (selection bias)	High risk	No randomization used, and further control centres were recruited due to low participant recruitment in original control centres
Incomplete outcome data (attrition bias) All outcomes	High risk	100% retention for self report, but more participants refused to provide cotinine samples in control (57% provided cotinine) than intervention (85% provided sample)
Blinding of outcome assessment (detection bias) All outcomes	Low risk	Biochemical validation used

French 2007

Methods	Country: USA Setting: Recruited from the hospital postpartum unit. Intervention involved home visit and telephone calls by nurses CT: intervention and control groups enrolled over different time periods
Participants	Postpartum women who had quit smoking during their pregnancy
Interventions	Intervention: Motivational interviewing, one 15 minutes home visit and two subsequent phone calls for under 15 minutes each Control: Usual care, which involved a home visit by a nurse without any smoking intervention
Outcomes	Final data collection six months from baseline Maternal self-reported smoking status and salivary cotinine level
Type of intervention	2. 'Well child' (peripartum)
Notes	71/219 attrition at six months

Risk of bias		
Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Unclear risk	Not applicable

French 2007 (*Continued*)

Allocation concealment (selection bias)	Unclear risk	Women in intervention and control groups had separate consents
Incomplete outcome data (attrition bias) All outcomes	High risk	Control group: 80% and 65% were available for data collection at 3 and 6 months, respectively Intervention Group: 87% and 69% provided information at 3 and 6 months, respectively
Other bias	High risk	Groups differed in marital status, depression scores, and previous quit attempts. Seperate consent forms used for women in control and intervention groups
Blinding of outcome assessment (detection bias) All outcomes	Low risk	Biochemical validation used

Greenberg 1994

Methods	Country: USA Setting: recruited at maternity hospitals, intervention in family home RCT	
Participants	933 mothers (141 who smoked) of newborn babies	
Interventions	Factorial design, 'Full' vs 'reduced' data collection. Full group visited at home when infants approximately 3 weeks old and had 2 weekly telephone questionnaire. Intervention: A study nurse visited homes 4 times for 45mins delivering a programme aimed at developing a mother's skills at maintaining a smoke-free environment for her child: information re child ETS exposure, sources of ETS and required the mother's participation. Written resources were left with the mother. Follow up visits were made 1,3 and 5 months later. Control: the only contact was for data collection.	
Outcomes	'Full' subgroup were surveyed and urine collected at baseline Data were collected again in homes when infants were 7 and 12 months old. Data on lower respiratory symptoms were collected by telephone survey every 2 weeks, in full subgroup	
Type of intervention	2. 'Well child' (peripartum)	
Notes	Full data for 583/933 (62%)	
Risk of bias		
Bias	**Authors' judgement**	**Support for judgement**

Greenberg 1994 (*Continued*)

Random sequence generation (selection bias)	Low risk	"Computer generated list of random numbers"
Allocation concealment (selection bias)	Low risk	Allocation performed by "a member of the administrative staff who was not involved with the conduct of the study"
Incomplete outcome data (attrition bias) All outcomes	Low risk	Similar rates of follow up in both groups (67% intervention, 75% control)
Blinding of outcome assessment (detection bias) All outcomes	Low risk	Biochemical validation used

Groner 2000

Methods	Country: USA Setting: hospital RCT
Participants	479 smoking mothers accompanying a child under 12 years to a hospital
Interventions	Two intervention groups ('Child Health Group' [CHG]; 'Mother's Health Group' [MHG]) and a control group. Intervention: received a brief (10-15 min) counselling session given by a trained nurse while waiting to see a doctor. Subjects in the CHG were informed of the hazards of ETS on their child, but not themselves; subjects in the MHG were informed of the effects of smoking on their own health but not their child. They were given standard self-help manuals and materials specific to their group allocation. Notably, even mothers in the CHG were not encouraged to change their smoking location. They received reminder postcards at 2 weeks and 4 months post intervention encouraging them to quit. Control Group: received usual care with no additional advice about smoking
Outcomes	Maternal smoking status; stage of change; CPD; smoking location; knowledge of ETS effects at 6 months. Assessment by telephone at 1 and 6 months post intervention, blinded assessor, or mailed questionnaire
Type of intervention	3. Child with health problems (ill child health care)
Notes	Retention: 232/479 (48%)

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Low risk	"Random numbers table"

Groner 2000 (*Continued*)

Allocation concealment (selection bias)	Unclear risk	Not specified
Incomplete outcome data (attrition bias) All outcomes	Low risk	High loss to follow-up (52% lost at 6m) but "there were no significant differences between subjects who completed the 2 follow-ups and other subjects in terms of... group assignment or any other baseline variable. Subjects lost to follow-up were considered continuing smokers, using the "intent to treat" model of analysis."
Blinding of outcome assessment (detection bias) All outcomes	Low risk	Self-report only, but not evidence of effect shown, so differential misreport judged to be unlikely

Halterman 2011

Methods	Country: USA Setting: School, with intervention at home RCT
Participants	Children aged 3 to 10 years with diagnosed asthma attending preschool or elementary school in the Rochester City School District, and their family
Interventions	Intervention: Motivational interviewing to counsel the primary caregiver about reducing smoke in the home and to provide brief smoking cessation counselling with the primary caregiver (if a smoker). Counseling of an additional household smoker who spends the most time with the child. Booster telephone calls at one and three months after counselling. The children received observed inhaler administration by a school nurse Control: Participants advised to contact their child's paediatrician regarding their persistent asthma symptoms
Outcomes	Seven to nine month follow-up from baseline Child salivary cotinine Asthma symptoms in peak winter season, November-February Asthma symptom-free days per two weeks Asthma symptom-free nights per two weeks Days with activity limitation per two weeks Days with rescue medication use per two weeks Days absent due to asthma per two weeks Acute office and emergency department visits, and hospitalisations, for an acute exacerbation of asthma
Type of intervention	3. Child with health problems (respiratory disorders)
Notes	
Risk of bias	

Halterman 2011 (*Continued*)

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	Used blocked randomisation, 1:1 ratio, scheme created by the biostatistics centre, stratified by smoking exposure at home
Allocation concealment (selection bias)	Unclear risk	Mention method of randomisation but it is not clear if the allocation was adequately concealed
Incomplete outcome data (attrition bias) All outcomes	Low risk	5 withdrawals from each arm (n=140 for intervention and 145 for control)
Blinding of outcome assessment (detection bias) All outcomes	Unclear risk	Interviewers blinded but children parents not blinded.

Hannover 2009

Methods	Country: Germany Setting: Recruited from maternity wards, with intervention at home RCT
Participants	Mothers of neonates who smoked during pregnancy or quit shortly prior to pregnancy
Interventions	Intervention: Counseling session based on motivational interviewing and relapse prevention and two telephone booster sessions 4 and 12 weeks after counselling Both groups received information brochures for themselves and their partners
Outcomes	Twenty four month follow-up from baseline Proportion of mothers who quit Proportion of mothers who do not restart smoking
Type of intervention	2. 'Well child' (peripartum)
Notes	

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	High risk	Allocated women to either intervention or control alternating the order on the screening forms
Allocation concealment (selection bias)	High risk	Whether allocation sequences would begin with treatment or control condition was decided ad hoc

Hannover 2009 (*Continued*)

Incomplete outcome data (attrition bias) All outcomes	High risk	High number revoked participation after randomisation and 25% not followed up at 24 months
Other bias	High risk	No ITT analysis.
Blinding of outcome assessment (detection bias) All outcomes	Low risk	"The nature of our intervention made blinding impossible". But later says follow up assessment interviews were conducted by trained interviewers who did not screen or counsel the women and were blind to the women's group membership

Herbert 2011

Methods	Country: Canada Setting: Recruited from five public health nursing offices, eight daycare centres and kindergartens on Prince Edward Island. Intervention in the community RCT
Participants	Parents with children under five years of age exposed to ETS
Interventions	Group sessions held once a week for three consecutive weeks, followed by weekly telephone calls for three additional weeks Both groups received a brochure on ETS
Outcomes	Six month follow-up from baseline The parent report of the average number of cigarettes smoked in the home daily Implementation of a total ban on smoking in the household
Type of intervention	1. Community-based
Notes	

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Low risk	Computer generated randomization sequence with block sizes of four or six
Allocation concealment (selection bias)	Low risk	Sequentially numbered opaque, sealed envelopes
Incomplete outcome data (attrition bias) All outcomes	Low risk	9/30 non attenders for intervention, ITT analysis done.

Blinding of outcome assessment (detection bias) All outcomes	Unclear risk	Phone interviews conducted and participants asked how they found the programme so interviewer could not be blind

Hovell 2000

Methods	Country: USA Setting: Individual counselling in person and by phone RCT
Participants	108 mothers smoking at least 2 CPD with child/ren <4 years, using a supplemental nutrition programme
Interventions	Intervention: Mothers given 7 individualised counselling sessions (3 in person, 4 by phone) designed to reduce child exposure to ETS. Mothers recorded their smoking and child's exposure and were given 'No Smoking' signs and stickers; at subsequent sessions new objectives were set and positive feedback to mothers was given, where appropriate. Total duration 3 months Control: usual care nutritional and brief advice about smoking and child ETS exposure
Outcomes	Child urine cotinine, reported exposure, parental smoking Mothers were surveyed at 3, 6 and 12 months, urine collected at baseline, 6 and 12 months
Type of intervention	3. Child with health problems (ill child health care)
Notes	Retention: 96/108 (89%)

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Low risk	"Random numbers were used to stratify assignments by three ethnic groups"
Allocation concealment (selection bias)	Unclear risk	"After the baseline measures, assistants opened an envelope to reveal assignments. " No further information provided
Incomplete outcome data (attrition bias) All outcomes	Low risk	ITT analyses, more losses to follow-up in intervention than control (42/53 intervention provided 12m urine sample, 52/55 control provided sample)
Blinding of outcome assessment (detection bias) All outcomes	Low risk	Biochemical validation used. "Measurement assistants were blind to group assignment. Control families were unaware of

		counselling procedures, and investigators were blind to results until all data were collected."

Hovell 2002

Methods	Country: USA Setting: Community Type: RCT
Participants	204 families with an asthmatic child from 3 to 17 years of age whose natural parent(s) were Latino or Hispanic, lived with at least 1 smoker and who reported exposure to at least 6 cigarettes in the previous week
Interventions	Intervention: Asthma management education session delivered in the home including generic advice to reduce child exposure to ETS. Follow-up coaching consisting of 7 in-home sessions of 30-45 minutes over 3 months plus follow-up phone call. Control: Asthma management education session and follow-up visits for measurement only
Outcomes	At 4, 7, 10 and 13 months. Parental report of child ETS exposure Child's urinary cotinine Air nicotine levels (20% of homes) Parental saliva cotinine
Type of intervention	3. Child with health problems (respiratory disorders)
Notes	Retention: 188/204 (92%). 11 participants dropped out prior to randomization, 5 dropped out before outcome measurement

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Low risk	"An Excel computer-generated list of random 3-digit numbers was constructed by clinic site"
Allocation concealment (selection bias)	Unclear risk	"Participants were assigned to the coaching condition and control condition based on numbers ending with even and odd digits, " no further information given
Incomplete outcome data (attrition bias) All outcomes	Low risk	ITT analysis conducted. Low drop-out rate: 3 control families, 2 intervention, "little or no sampling bias attributable to attrition."

Hovell 2002 (*Continued*)

Blinding of outcome assessment (detection bias) All outcomes	Low risk	Biochemical validation used. "Control families were unaware of coaching procedures and continued in the study for measurement purposes only. Interviewers were blind to group assignment and investigators were blind to results until all data were collected."

Hovell 2009

Methods	Country: USA Setting: At home RCT
Participants	Mothers who smoke, with children younger than four years
Interventions	Intervention: 10 in-person at home and 4 telephone counselling sessions over 6 months, and additional pre- and post-quit telephone sessions Control: Referral to the free California Smoker's Helpline (usual care)
Outcomes	Eighteen month follow-up from baseline Children's urine cotinine concentration Parents' smoking status - self reported and confirmed with salivary cotinine Air nicotine measured in randomly selected homes
Type of intervention	3. Child with health problems (ill child health care)
Notes	Recruited from the Supplimental Nutrition Programme for Women, Infants and Children

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Low risk	"random number list was used to assign pairs of participants matched on child's gender, ethnicity and recruitment site"
Allocation concealment (selection bias)	Unclear risk	Not stated
Incomplete outcome data (attrition bias) All outcomes	Low risk	18 month interview 64/74 controls and 66/76 intervention group
Other bias	High risk	However, "baseline children's urinary cotinine concentration was significantly higher among controls, indicating that randomization did not balance the groups with respect to cotinine"

Blinding of outcome assessment (detection bias) All outcomes	Low risk	"Data collection research assistants were blind to group assignment, and control families were unaware of counselling procedures. Investigators were blind to results until all data were collected."

Hughes 1991

Methods	Country: Canada Setting: Hospital and home, asthma management programme RCT
Participants	95 children admitted to hospital in the previous 5 years with asthma, and their parents (not all smokers)
Interventions	Intervention: cared for by a paediatric respiratory physician through the 12m study period. In addition, seen at clinic visits and visited at home by a nurse coordinator who provided written information about asthma care and carried out an asthma education session around lung and airway anatomy, asthma episodes and treatment. Patient's home visited at least 3 times. Environmental exposures checklist drawn up; role of cigarette smoke discussed; parents discouraged from smoking in the home and encouraged to participate in a smoking cessation programme. Control: patients managed by their usual primary care physicians and reviewed by the study physician at intervals
Outcomes	At 12 months: Exposure to ETS at home. (Primary study outcomes were related to asthma management)
Type of intervention	3. Child with health problems (respiratory disorders)
Notes	

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Low risk	"A process of restricted randomization based on age and number of previous hospitalizations during the previous 5 years was carried out. Subjects were alternately assigned to study or control groups, with the initial assignment for each pair determined by a coin toss."
Allocation concealment (selection bias)	Low risk	See above

Hughes 1991 (*Continued*)

Incomplete outcome data (attrition bias) All outcomes	Low risk	Low drop-out - 3 lost from each group
Blinding of outcome assessment (detection bias) All outcomes	Low risk	Smoking status reliant on self-report, however no evidence of effect so differential misreport judged to be unlikely

Irvine 1999

Methods	Country: Scotland Setting: home RCT
Participants	501 smoking parents of children with asthma
Interventions	Intervention: brief advice from a nurse visiting the family home; information about passive smoking and asthma, financial and health benefits of quitting; information on how to stop smoking; advised to move to a different room or outside the home if they did not intend to quit; advised not to allow visitors to the home to smoke. Given 2 leaflets at baseline- one commercially available and the other to reinforce the brief advice. Questionnaires were completed. Further leaflets were distributed by mail at 4 and 8months after baseline with a letter encouraging them to stop smoking. Control: participants received the commercial leaflet at baseline but nothing else
Outcomes	At 12 months: Child's saliva cotinine; Mother's saliva cotinine Self-reported quit attempts
Type of intervention	3. Child with health problems (respiratory disorders)
Notes	Retention: 435/501 (87%)

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Unclear risk	"Randomized," no further information given
Allocation concealment (selection bias)	Unclear risk	Not specified
Incomplete outcome data (attrition bias) All outcomes	Low risk	86.8% provided samples at follow-up, percentage lost similar in both groups and reasons provided
Blinding of outcome assessment (detection bias) All outcomes	Low risk	Biochemical measures used

Kallio 2006

Methods	Country: Finland Setting: Community, well baby clinics RCT
Participants	1062 families presenting at a well baby clinic in Turku with a child of 5 months old
Interventions	Component of larger prospective intervention trial aimed at decreasing exposure of children to known environmental cardiovascular risk factors. Intervention: Parents received booklet about the adverse effects of smoking at age 5 years. Counselling from paediatrician and dietician about major cardiovascular risk factors including smoking generally discussed with parents. Appointment with paediatrician and dietician at 1-3 monthly intervals until age 2 years, then 6 monthly. Control: Normal health education given to all Finnish families at well baby clinics and through school system. Appointment with paediatrician and dietician at 4-6 monthly intervals until age 2 years, then 6 monthly until age 7, then yearly
Outcomes	Follow up when child 8 years of age. Parent report of smoking status and habits, reported child exposure to ETS in past 3 days. Parent serum cotinine.
Type of intervention	2. 'Well child' (child health check)
Notes	Retention: 625/1062 (59%)

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	"Random numbers," further details not provided
Allocation concealment (selection bias)	Unclear risk	Not described
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	High but similar dropout rates in both groups overall (serum cotinine measured in 306/540 intervention and 319/522 control). However, attrition of smokers only not quantified and attrition analysis not reported. The authors write: "It is possible that smokers have discontinued participation in STRIP more frequently than non-smokers."
Blinding of outcome assessment (detection bias) All outcomes	Low risk	Biochemical validation used

Kimata 2004

Methods	Country: Japan Setting: Hospital outpatient clinic RCT
Participants	Children with mild atopic eczema/dermatitis syndrome and normal children whose parents smoked 10-15 CPD at home
Interventions	Intervention: Not clear: "Parents of the cessation of passive smoking group agreed to stop smoking" Control: Usual care
Outcomes	At 1 month: Child urinary cotinine Child skin wheal response Child plasma neurotrophin levels
Type of intervention	3. Child with health problems (ill child health care)
Notes	Not provided.

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	"Randomly divided," no further information provided
Allocation concealment (selection bias)	Unclear risk	Not described
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	No information provided
Blinding of outcome assessment (detection bias) All outcomes	Low risk	Biochemical validation used

Krieger 2005

Methods	Country: USA Setting: Community Type: RCT
Participants	274 low income households containing a child aged 4-12 years who had asthma recruited by media publicity, hospitals and emergency departments
Interventions	Intervention: High-intensity intervention with community health workers providing in home environmental assessments, education, support for behaviour change (7 sessions) and a full set of resources.

Krieger 2005 (*Continued*)

	Control: Low-intensity intervention group received a single visit and limited resources
Outcomes	Parent self report Pediatric asthma caregiver quality of life Self reported asthma related urgent health care service use Participant report of presence of asthma triggers in the home, including smoking behaviour
Type of intervention	3. Child with health problems (respiratory disorders)
Notes	Retention: 110/138(80%) in high intensity and 104/136(76%) in low intensity group

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Low risk	"We randomly assigned participants to groups using a permuted block design with varying block size."
Allocation concealment (selection bias)	Low risk	"Sequence numbers and group allocation were concealed in sealed, opaque, numbered envelopes prepared centrally and provided sequentially to interviewers."
Incomplete outcome data (attrition bias) All outcomes	Low risk	"We performed an intention-to-treat analysis by using the baseline value of the outcome variable of interest as the exit value for participants who did not complete the study, which yields a conservative estimate of intervention effect." Similar follow-up rates in both groups (110/138 intervention, 104/136 control)
Blinding of outcome assessment (detection bias) All outcomes	Low risk	"The nature of the intervention made it impossible to blind participants and staff to group assignment." However, combination of objective and subjective measures and all participants received visit from counsellor, so differential misreport unlikely

McIntosh 1994

Methods	Country: USA Setting: clinic RCT
Participants	92 smoking parents of children with asthma

McIntosh 1994 (*Continued*)

Interventions	Intervention: child's physician delivered a standardized passive smoking message to parents, consisting of counselling about the effects of passive smoking and advice to quit or smoke outside. Parents given a specifically designed pamphlet that reinforced this message. About 1 month later, parents received a personalized letter from the principal investigator, containing the result and explanation of their child's urine cotinine test. Included was a self-help manual aimed at encouraging smoking outside. Control: Parents received the physician's message and the pamphlet only
Outcomes	At 4-6 months: Self-reported location of smoking, attempts to quit; Child urine cotinine
Type of intervention	3. Child with health problems (respiratory disorders)
Notes	Retention: 72/92 (78%)

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Low risk	"Families were randomly assigned... at the time of enrolment using a coin toss method"
Allocation concealment (selection bias)	Low risk	See above
Incomplete outcome data (attrition bias) All outcomes	Low risk	Slightly higher dropout rate in control than intervention (37/44 followed up in intervention, 35/48 followed up in control), ITT analysis not reported, but per protocol analysis more conservative in this instance so judged to be at low risk of bias
Blinding of outcome assessment (detection bias) All outcomes	Low risk	Biochemically validated outcome

Nuesslein 2006

Methods	Country: Germany Setting: Paediatric clinic RCT
Participants	40 mothers attending participating paediatric practice and self reporting smoked at least 10 CPD
Interventions	All participants received a quit smoking information sheet and had urinary cotinine levels taken. Intervention: Received results of their cotinine levels within 1 week.

Nuesslein 2006 (*Continued*)

	Control: Did not receive results of cotinine levels until completion of data collection	
Outcomes	At 6 weeks. Maternal self report of tobacco consumption Urinary cotinine levels	
Type of intervention	4. Mixed / not stated	
Notes	Nicotine consumption did not differ at baseline (median 12 ug for both)	
Risk of bias		
Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	High risk	Randomized by patient numbers (odd or even)
Allocation concealment (selection bias)	Unclear risk	Not stated
Incomplete outcome data (attrition bias) All outcomes	Low risk	Only 2 (out of 40) missing at final follow-up
Blinding of outcome assessment (detection bias) All outcomes	Low risk	Biochemical validation used

Patel 2012

Methods	Country: Florida, USA Setting: Hospital emergency department RCT	
Participants	Child aged <36 months with a smoking caregiver presenting to the emergency department	
Interventions	The intervention group received brief education about third hand smoke and the control group received "routine education" from the emergency physician	
Outcomes	Caregivers change in smoking status or policies for smoking in the home or car	
Type of intervention	3. Child with health problems (ill child health care)	
Notes	N=40, 65% loss to follow up	
Risk of bias		
Bias	**Authors' judgement**	**Support for judgement**

Patel 2012 (*Continued*)

Random sequence generation (selection bias)	Unclear risk	No information provided
Allocation concealment (selection bias)	Unclear risk	No information provided
Incomplete outcome data (attrition bias) All outcomes	High risk	65% loss to follow up from a small sample
Other bias	High risk	Selection - very small sample size, convenience sample and reporting of results unclear how numbers derived and use of ITT analysis
Blinding of outcome assessment (detection bias) All outcomes	Unclear risk	No information provided, objective measure not used

Phillips 2012

Methods	Country: USA Setting: Hospital RCT
Participants	Mothers who had previously smoked, with babies in the neonatal intensive care unit
Interventions	Intervention: Given information about bonding with the infant Both groups given handouts regarding second-hand smoke exposure and the neonatologist used motivational interviewing to prevent reuptake of smoking by the mother
Outcomes	Eight week follow-up from baseline Re-uptake of smoking by mother, measured by self-report, carbon monoxide oximetry and salivary cotinine
Type of intervention	3. Child with health problems (ill child health care)
Notes	

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Low risk	Computer generated random table
Allocation concealment (selection bias)	Low risk	Sequentially numbered opaque envelopes

Phillips 2012 (*Continued*)

Incomplete outcome data (attrition bias) All outcomes	High risk	Salivary cotinine levels only on 67% of mothers who completed the study (45% from control and 55% from intervention)
Other bias	High risk	Small numbers - intervention n=24 and control n=30. More mothers in the intervention than control group had private insurance (p=0.02). Trend for infants in the int group to have lower birth weight (p=0.08) and longer length of stay (p=0.08). Insurance found to be significantly associated with kaplan meir remaining smoke free and tried to control for this
Blinding of outcome assessment (detection bias) All outcomes	Low risk	Biological measure used.

Prokhorov 2013

Methods	Country: Texas, USA Setting: Home RCT
Participants	Households with a child under the age of 18 years and two adults, one of whom was a smoker
Interventions	One culturally-appropriate bilingual comic book for children and two fotonovelas for adults
Outcomes	Reduce household smoking - report and two nicotine air sampling monitors Self-reported smoking status given (for the smoker) Increase in knowledge of health effects of SHS
Type of intervention	2. 'Well child' (child health check)
Notes	

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Unclear risk	Method of randomisation not specified
Allocation concealment (selection bias)	Unclear risk	Not stated
Incomplete outcome data (attrition bias) All outcomes	High risk	76 of 91 households completed 12 months follow up, no ITT analysis stated

Prokhorov 2013 (*Continued*)

Other bias	High risk	No ITT analysis. Air nicotine levels higher in intervention group but not significantly so
Blinding of outcome assessment (detection bias) All outcomes	Low risk	Environmental nicotine monitors as outcome

Pulley 2002

Methods	Country: USA Setting: Recruted from postpartum units, intervention involved home visits Quasi-experimental RCT
Participants	Postpartum mothers who smoke and breastfeed infants
Interventions	Intervention: Educational intervention regarding "smoking hygiene" to reduce ETS exposure of infant. Education was delivered by a nurse, and the participants were given an education pamphlet. Air purifiers were provided Control: data collection only
Outcomes	Mothers completed a smoking habits questionnaire at baseline and at completion of the follow up period, three weeks later Frequency of respiratory symptoms in the infant, and hospitalisation recorded at baseline and three weeks later
Type of intervention	2. 'Well child' (peripartum)
Notes	8/29 dropped out after enrolment. Follow-up period was three weeks

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Unclear risk	No information provided.
Allocation concealment (selection bias)	Unclear risk	No information provided.
Incomplete outcome data (attrition bias) All outcomes	High risk	Eight dropped out (25%), four from each arm - very high attrition - left 12 in intervention and 9 in control group. Didn't do ITT
Other bias	High risk	Significant difference in numbers of cigarettes smoked in pregnancy between intervention (sig. higher) and control group - p=0.26. No ITT analysis. Very small study

Pulley 2002 (*Continued*)

Blinding of outcome assessment (detection bias) All outcomes	High risk	Data collector aware which group the participants were assigned

Ralston 2008

Methods	Country: USA Setting: Hospital RCT
Participants	Smoking caregivers of children hospitalised for respiratory illness
Interventions	Intervention: Couselling according to current clinical practice guidelines (US Public Health guidelines "Treating Tobacco Use and Dependence). This includes nicotine replacement therapy Control: Received a brief anti-smoking message and referral to the state's quitline
Outcomes	Six month follow-up post-hospitalisation Self-report of parental smoking cessation Parental quit attempts Proportion reporting they set a quit date
Type of intervention	3. Child with health problems (respiratory disorders)
Notes	

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Unclear risk	No information provided.
Allocation concealment (selection bias)	Unclear risk	No information provided.
Incomplete outcome data (attrition bias) All outcomes	High risk	High attrition but those loss to follow up treated as smokers. Unclear which arm data is missing from
Other bias	High risk	Very small study so may produce spurious result - only 20% of those eligible participated. Differences in baseline group measurement
Blinding of outcome assessment (detection bias) All outcomes	Unclear risk	No information provided.

Ralston 2013

Methods	Country: USA Setting: Hospital RCT
Participants	Tobacco smoking caregiver aged over 18 years with a hospitalised child
Interventions	Intervention group - brief intervention recommending tobacco cessation followed by referral to the state tobacco quitline, and received a smoking cessation brochure produced by the American Cancer Society. Both groups received an age-appropriate injury prevention brochure
Outcomes	Self-reported quit status (defined as self-reported abstinence for at least 1 week). Secondary outcomes: decrease in cigarettes smoked per day; increase of importance of quitting on a 1-10 scale; report of any contact with state quitline
Type of intervention	3. Child with health problems (ill child health care)
Notes	

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Low risk	Random numbers computer generated
Allocation concealment (selection bias)	Low risk	Sequential sealed envelopes used
Incomplete outcome data (attrition bias) All outcomes	High risk	High level of loss to follow-up (n=19/60, 32%) . However, did do an ITT analysis, and those lost to follow-up were treated as ongoing smokers
Blinding of outcome assessment (detection bias) All outcomes	High risk	Telephone interviewers were not always not blinded (but did have a script)

Ratner 2001

Methods	Country: Canada Setting: Community Type: RCT
Participants	251 mothers who had quit smoking during pregnancy
Interventions	Intervention: Mothers received nurse-delivered telephone support, relapse prevention training and information resources. Control: Usual care

Ratner 2001 (*Continued*)

Outcomes	Self report of smoking status Biological verification with exhaled CO.	
Type of intervention	2. 'Well child' (peripartum)	
Notes	Retention: 238/251 (95%)	
Risk of bias		
Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Low risk	"Identification numbers randomly assigned to 2 groups, in blocks of 50, via a computer software package."
Allocation concealment (selection bias)	Unclear risk	No details provided
Incomplete outcome data (attrition bias) All outcomes	Low risk	Similar rates of follow-up in both groups at 12m, and 95% retention (238/251)
Blinding of outcome assessment (detection bias) All outcomes	Low risk	Biochemical validation used at in person follow-ups (89% of participants). "Only 1. 4% of the self-reports of abstinence were contradicted by CO readings of $\geq$ 10 ppm; these women were classified as smokers."

Schonberger 2005

Methods	Country: Netherlands Setting: Community RCT; cluster
Participants	476 children seen to be at high risk of asthma recruited during the prenatal period
Interventions	Intervention: 3 home visits (2 prenatal and 1 post-natal) with recommendations to reduce 4 main environmental exposures of mite allergens, pet allergens, food allergens, and passive smoking pre- and post-natally. Control: Usual care
Outcomes	Parent report of child ETS exposure Maternal CO Child IgE Tidal airway resistance and lung function Allergen measures
Type of intervention	2. 'Well child' (peripartum)

Schonberger 2005 (*Continued*)

Notes	Retention: 443/ 476 (93%)	
Risk of bias		
Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Unclear risk	Pre-randomization, no further information provided
Allocation concealment (selection bias)	Unclear risk	"To prevent contamination... the prerandomisation was performed in clusters, taking into account the post (zip) code of the domicile of the recruited family in combination with the location of the general practice the family attended. Once a general practice was allocated, every family subsequently recruited in that practice was allocated automatically to the same group. "
Incomplete outcome data (attrition bias) All outcomes	Low risk	93% retention, similar number completed follow-up in both groups (222/242 intervention, 221/234 control), attrition and ITT analyses performed
Blinding of outcome assessment (detection bias) All outcomes	High risk	Self-report only, "reporting bias cannot be excluded as an explanation for the decrease in asthma-like symptoms in the intervention group at age 2 yrs."

Severson 1997

Methods	Country: USA Setting: Hospital & well baby clinics RCT, randomization by practice
Participants	2901 mothers of newborn babies who had smoked prior to pregnancy (1875 smokers, 1026 nonsmokers at enrolment
Interventions	In the first 1 to 3 days after birth in hospital, mothers received a packet containing a brochure and a letter from the paediatrician about the health affects of passive smoking, and a no-smoking sign. Intervention: Mothers received further materials and brief oral counselling from the paediatrician at the well baby visits at age 2 weeks and 2, 4, and 6 months. Paediatricians received a 45min training session. Control: received the hospital packet only.

Severson 1997 (*Continued*)

Outcomes	Assessment at 6 and 12 months by mailed questionnaire: Quit rates (sustained at 6 and 12months, and point prevalence at 12months) CPD, readiness to quit, likelihood of quit attempt. Secondary outcomes: knowledge of and attitudes towards ETS
Type of intervention	2. 'Well child' (peripartum)
Notes	Retention: 2003/2901 (69%) 1-tailed T test employed

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	Cluster-randomized by practice, method not described
Allocation concealment (selection bias)	Unclear risk	Method of allocating practices not described. All eligible patients enrolled, "because the survey information was anonymous, and because smoking counselling was considered to be standard medical practice, the study was exempted from the requirements for obtaining informed consent."
Incomplete outcome data (attrition bias) All outcomes	Low risk	Losses to follow up (31% in each group) assumed to have relapsed, attrition analyses performed
Blinding of outcome assessment (detection bias) All outcomes	Low risk	No biochemical validation but cluster randomized by practice, followed up anonymously via survey, differential misreport unlikely

Stotts 2012

Methods	Country: USA Setting: Neonatal Intensive Care Unit, Hospital RCT (3 groups)
Participants	Families with a smoker at home; infant in NICU at high respiratory risk
Interventions	Motivational interviewing. There were three groups; motivational interviewing, usual care, and usual care-reduced measurement. The motivational interviewing group had two hospital-based sessions of approximately 40 minutes each, two personalised letters and two phone feedback sessions targeting infant ETS reduction. Reduced measurement group refers to reducing follow up as this is thought to affect behaviour of control group

Stotts 2012 (*Continued*)

Outcomes	Air nicotine monitors Infant end-tidal carbon monoxide Self-report measures of home and car smoking bans
Type of intervention	3. Child with health problems (respiratory disorders)
Notes	In process of publication, information taken from a report.

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Unclear risk	Not stated
Allocation concealment (selection bias)	Unclear risk	Not stated
Incomplete outcome data (attrition bias) All outcomes	High risk	High degree of loss to follow-up by 6 months (intervention 51/70 completed, usual care 21/34 completed, and usual care reduced measurement 28/40 completed)
Blinding of outcome assessment (detection bias) All outcomes	Low risk	Air nicotine monitors used

Tyc 2013

Methods	Country: USA Setting: Hospital RCT
Participants	Parents or guardians of children receiving treatment for cancer who lived with at least one adult smoker and were exposed to SHS in the home or car setting
Interventions	Counselling (multi-component behavioural programme) delivered by trained counsellors over three months - three individual, face-to-face biweekly one hour sessions followed by three 25min telephone sessions. Parents received literature about SHS-related health risks for children and for stress management. Did not involve formal cessation counselling. Standard care group given brief advice about removing child from sources of exposure, and advised about adverse health problems
Outcomes	Parent reported child SHS exposure Child urinary cotinine Parent-repored smoking

Tyc 2013 (*Continued*)

Type of intervention	3. Child with health problems (ill child health care)	
Notes		
Risk of bias		
Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Low risk	Stratified, blocked randomization scheme with strata being child's age (≤5, 6-12, 13-17 years) , race (White, non-White), and smoking status of the participating parent (smoker, non-smoker)
Allocation concealment (selection bias)	Unclear risk	Not stated
Incomplete outcome data (attrition bias) All outcomes	Low risk	10/135 lost to follow up, ITT analysis
Blinding of outcome assessment (detection bias) All outcomes	Low risk	Urinary cotinine as measure (objective)

Van't Hof 2000

Methods	Country: USA Setting: Hospital and well-baby visits RCT	
Participants	Postpartum women with a history of smoking in the 30 days prior to pregnancy	
Interventions	Intervention: Initial nurse delivered relapse prevention counselling for 15 to 30 minutes. At the two week, and two and four month well-baby visits with the paediatric provider they received reinforcement if they had not restarted smoking. If they had restarted smoking they were given encouragement and a plan to try and quit again Control: Received no counselling and "standard care" from the paediatric provider	
Outcomes	Follow-up six months from baseline Proportion of mothers who maintain smoking cessation postpartum	
Type of intervention	2. 'Well child' (peripartum)	
Notes	Had salivary cotinine at baseline only	
Risk of bias		
Bias	**Authors' judgement**	**Support for judgement**

Van't Hof 2000 (*Continued*)

Random sequence generation (selection bias)	Unclear risk	No information provided.
Allocation concealment (selection bias)	Unclear risk	No information provided.
Incomplete outcome data (attrition bias) All outcomes	Low risk	
Blinding of outcome assessment (detection bias) All outcomes	Unclear risk	No information provided.

Vineis 1993

Methods	Country: Italy Setting: Immunization Clinic CT: Non-random assignment
Participants	1015 parents of newborn babies (all mothers including nonsmokers recruited) recruited when attending the clinic for the 3 month vaccination of the infant
Interventions	Intervention: counselled for 15min by a nurse on the health effects of active smoking and ETS, 3 booklets, one of which was about the health effects of ETS on children. Control: did not receive counselling or booklets.
Outcomes	At 2 and 4 years: self-reported cessation
Type of intervention	2. 'Well child' (child health check)
Notes	Retention: 747/1015 (74%)

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	High risk	"Non-randomized experimental design"
Allocation concealment (selection bias)	High risk	See above
Incomplete outcome data (attrition bias) All outcomes	Low risk	Similar follow-up rates in both groups (304/402 intervention, 443/616 control). Participants who had moved away were excluded from analysis
Blinding of outcome assessment (detection bias)	High risk	Self-report only, differential misreport possible

Vineis 1993 (*Continued*)

All outcomes		

Wahlgren 1997

Methods	Country: USA Setting: Paediatric allergy medical clinics RCT
Participants	91 families with children with asthma
Interventions	Intervention: parent and child attended a series of intensive counselling sessions over 6 months designed to reduce child's exposure to parental smoking. Diaries were used in the 2 weeks preceding visits to record parental smoking, child's ETS exposure, child's peak flow readings and child's symptoms. These data were used for tailored counselling. Control (Monitoring): Used the same monitoring methods but did not receive counselling. Control (Usual Care): Attended the same frequency of clinics but did not maintain records nor receive counselling
Outcomes	At 6 months from end of intervention: Parent self report of cigarettes smoked in presence of child. Air nicotine in room with heaviest child exposure measured by environmental monitor. 2 years later, after debriefing about the study, the two comparison groups achieved similar reductions in parent-reported rates of child exposure and the intervention parent-reported child exposure rate was similarly maintained
Type of intervention	3. Child with health problems (respiratory disorders)
Notes	

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Unclear risk	"Randomized," no further information provided
Allocation concealment (selection bias)	Unclear risk	Not described
Incomplete outcome data (attrition bias) All outcomes	Low risk	High rate of follow-up at 12m across all groups (28/31 intervention, 28/28 monitoring control, 26/32 usual care)
Blinding of outcome assessment (detection bias) All outcomes	Low risk	Self report validated by environmental monitor

Wakefield 2002

Methods	Country: Australia Setting: recruited from paediatric outpatient clinics, intervention by mail and phone CT: alternation by week of attendance at clinic
Participants	292 smoking parents of children aged 1-11 with asthma
Interventions	At baseline urine analysed for cotinine:creatinine ratio. Intervention: parents sent a letter signed by the study coordinator explaining their child's baseline cotinine-to-creatinine ratio, and encouraging banning smoking at home. 2 booklets enclosed: 1 explained the effects of ETS on children and gave advice to parents on its restriction; the other concerned quitting. The index parent was contacted by telephone 1 week and 1 month later for advice and encouragement. Control: usual advice about smoking from doctors and nurses.
Outcomes	At 6 months: smoking bans at home: Secondary study outcomes: parent reports of bans on smoking in car; CPD child urinary cotinine; parent-reported cessation
Type of intervention	3. Child with health problems (ill child health care)
Notes	Retention 264/292 (90.4%)

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	High risk	"Families were allocated by alternate week to either an intervention or control group. "
Allocation concealment (selection bias)	High risk	No information provided, but method of sequence generation makes allocation concealment highly unlikely
Incomplete outcome data (attrition bias) All outcomes	Low risk	Similar rates lost to follow-up in both groups (10.5% intervention, 8.7% control)
Blinding of outcome assessment (detection bias) All outcomes	Low risk	Children's cotinine levels used to validate self report of smoking bans

Wiggins 2005

Methods	Country: UK Setting: Community Type: RCT

Wiggins 2005 (*Continued*)

Participants	731 mothers who lived in deprived London districts and met the inclusion criteria after answering an information leaflet
Interventions	Intervention Group 1: Support Health Visitor intervention consisting of monthly supportive listening visits to the mother's home, beginning when the baby was 10 weeks old. The primary focus was on the mother rather than her child, as well as providing practical support and information. Intervention Group 2: Assignment to one of eight community groups that offered service for mothers with children less than 5 years in the study area. Control: Usual care
Outcomes	Childhood injury, maternal depression and smoking Uptake and cost of health services, household resources, maternal and child health, experiences of motherhood and infant feeding
Type of intervention	2. 'Well child' (peripartum)
Notes	Retention: 601/731

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Low risk	"The allocation sequence was computer generated and minimisation was used to provide a reasonable balance on three potential confounders..."
Allocation concealment (selection bias)	Low risk	"Recruiters provided a centrally based administrator with the participant's name and information on the minimisation factors. These data were entered into the computer program to determine the participant's allocation."
Incomplete outcome data (attrition bias) All outcomes	Low risk	Similar rates of follow-up at 12m in all groups (82% control, 85% community group intervention, 80% support health visitor intervention). Intention to treat analyses used
Blinding of outcome assessment (detection bias) All outcomes	High risk	Self-report via postal questionnaire, "because of the nature of the interventions, it was not possible for either the trial participants or the researchers to be blinded to group allocation."

Wilson 2001

Methods	Country: USA Setting: Paediatric pulmonary service of a paediatric hospital RCT
Participants	87 parents of children aged 3-12 with asthma and who were ETS exposed. (At baseline 61% of intervention group maternal caregivers smoked vs 42% of controls)
Interventions	All children examined at baseline by a paediatric pulmonary specialist, and their treatment adjusted as appropriate. Intervention: Caregiver received 3 nurse-led sessions over a 5 week period, employing behaviour-change strategies and basic asthma and ETS education, along with repeated feedback on the child's urinary cotinine level (measured each session). The child and other family members were sometimes involved. Control: caregivers received basic asthma advice by a nurse, along with the statement that ETS is to be avoided. Mothers who requested the cotinine result were told whether or not cotinine had been detected
Outcomes	At 12 months: Urinary cotinine, acute asthma episodes. Secondary study outcomes were hospitalisation, prohibition of smoking in the home; CPD; parent-reported exposure of children and asthma control
Type of intervention	3. Child with health problems (respiratory disorders)
Notes	Follow-up cotinine data obtained in 51/87 (59%)

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Unclear risk	"Randomization design with blocks of length four," no further information provided
Allocation concealment (selection bias)	Unclear risk	Not specified
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	Intention to treat analysis conducted, "attrition rates on the cotinine data were equivalent in the intervention and control groups": (25/44 intervention, 26/43 control)
Blinding of outcome assessment (detection bias) All outcomes	Low risk	Biochemical measure used

Wilson 2011

Methods	Country: USA Setting: Participants identified from insurer database, counselling intervention delivered in the community RCT
Participants	Caregivers of children aged 3 to 12 years old who have asthma and are exposed to second-hand smoke
Interventions	Three counselling visits, including continine feedback, and three follow-up phone calls
Outcomes	Twelve month follow-up from baseline Child urinary cotinine creatinine ratio Child asthma-related use of healthcare resources (asthma visits and medication use) Home smoking bans Caregiver smoking status
Type of intervention	3. Child with health problems (respiratory disorders)
Notes	

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Low risk	Computer algorithm used.
Allocation concealment (selection bias)	Unclear risk	No information provided.
Incomplete outcome data (attrition bias) All outcomes	Low risk	Low loss to follow up.
Blinding of outcome assessment (detection bias) All outcomes	Low risk	Study staff performing follow up blinded, asthma assessments blinded. Biological measure used

Winickoff 2010

Methods	Country: USA Setting: Hospital and community Quasi-experimental RCT
Participants	101 mothers and fathers of newborns recruited on the post-natal ward who were current smokers or recent quitters
Interventions	Intervention: A 15 minute counselling session in person, enrolment in a proactive state quitline, follow-up faxes to their health professionals with tailored treatment measures Control: Usual care

Winickoff 2010 (*Continued*)

Outcomes	3 month follow up where participants enrolment in the state smoking quit line was assessed and the self-reported smoking status was taken with a salivary cotinine level as confirmation of a self-reported 7-day point prevalence cessation
Type of intervention	2. 'Well child' (child health check)
Notes	Retention: 75% Control and 69% Intervention available for follow up

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	High risk	"Participants were assigned to either the control or the intervention condition on the basis of the date the mother was admitted to the postpartum floor."
Allocation concealment (selection bias)	High risk	See above
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	No significant difference in follow-up between groups (75% control and 69% Intervention), intention to treat analysis performed
Blinding of outcome assessment (detection bias) All outcomes	Low risk	Biochemical validation used

Woodward 1987

Methods	Country: Australia Setting: maternity hospital CT: allocation by month of delivery
Participants	184 parents of newborn babies whose mothers smoked during pregnancy
Interventions	Intervention: mothers in the maternity hospital were given an information kit about the effects of ETS on children, and ways to quit smoking and a letter from the director of the neonatal Intensive Care Unit urging parents to avoid exposing children to ETS. The kit was given to women by a research worker, who explained the material and answered questions. Women were telephoned at 1 month and asked about their progress, use of the kit, and given further information if required. Control and Follow up only: did not receive the above intervention
Outcomes	At 3 months: Infant urine cotinine levels Maternal quitting, maternal cotinine

Woodward 1987 (*Continued*)

Type of intervention	2. 'Well child' (peripartum)	
Notes	Retention: 157/184 (85%)	
Risk of bias		
Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	High risk	Non-randomized, group assignment by month of admission
Allocation concealment (selection bias)	High risk	See above
Incomplete outcome data (attrition bias) All outcomes	Low risk	Similar and high rates of follow-up in both groups (54/61 intervention, 57/62 control)
Blinding of outcome assessment (detection bias) All outcomes	Low risk	Biological validation used

Yilmaz 2006

Methods	Country: Turkey Setting: Hospital RCT	
Participants	375 mothers with children attending 'well child' clinic or for any primary complaint	
Interventions	Intervention 1: Smoking cessation intervention aimed at child's health Intervention 2: Smoking cessation intervention aimed at mothers' health Control: No smoking cessation advice	
Outcomes	Maternal smoking status Smoking location change Post-intervention knowledge change	
Type of intervention	4. Mixed / not stated	
Notes		
Risk of bias		
Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	High risk	"Each mother was assigned the number of the questionnaire she filled in... Then the mothers were randomly assigned by a nurse

Yilmaz 2006 (*Continued*)

		who doesn't know anything about the study and the groups to one of three groups by randomly picking numbers form the list of questionnaire/mother numbers."
Allocation concealment (selection bias)	High risk	See above, breaking of allocation concealment possible
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	"12 (out of 375) families could not be contacted and were therefore excluded from the analysis." Unclear which groups those not reached came from
Blinding of outcome assessment (detection bias) All outcomes	High risk	No biochemical validation used, differential misreport possible

Zakarian 2004

Methods	Country: USA Setting: Community RCT	
Participants	150 smoking mothers with children aged 4 or younger	
Interventions	Principal investigator and project coordinator met with medical directors from each clinic to plan the investigation implementation and then regularly through the study to 'enlist participation and ongoing support' Intervention: 7 behavioural counselling sessions (3 in-person and 4 over the telephone) over 6 months. Mothers were assisted with developing plans to re-shape their and other household members' smoking behaviours. Mothers were asked to use pictorial charts and to self monitor their smoking and exposure. If participant asked counsellor for help with quitting smoking they were issued a 'Quit Kit' from the American Cancer Society. Control: Usual care and 3, 6, and 12 month follow-up measures	
Outcomes	Mother report of smoking status and child's exposure to ETS Child urinary cotinine concentrations Air nicotine monitors	
Type of intervention	2. 'Well child' (child health check)	
Notes	Retention: 128/150 (85%)	
Risk of bias		
Bias	**Authors' judgement**	**Support for judgement**

Zakarian 2004 (*Continued*)

Random sequence generation (selection bias)	Unclear risk	"Assignment was stratified by child's age, ethnicity, gender, and clinic site. Random number lists were generated for each strata. "
Allocation concealment (selection bias)	Low risk	"Within each group of four numbers corresponding to four participants in that strata, the first two even numbers were assigned to the experimental group."
Incomplete outcome data (attrition bias) All outcomes	Low risk	Intention to treat analyses, "mothers who were lost to follow-up and not measured were counted as smokers." 68/74 control and 60/76 intervention reached at final follow-up
Blinding of outcome assessment (detection bias) All outcomes	Low risk	Biochemical validation used. "Research assistants who obtained measurements were blind to group assignment, and control families were unaware of counselling procedures."

Zhang 1993

Methods	Country: China Setting: school CT; schools in one district received intervention, compared with schools in a second district	
Participants	20382 children in 44 primary schools. 68.8% of Intervention and 65.5% of Control fathers smoked at baseline	
Interventions	Intervention: a tobacco prevention curriculum was introduced comprising social and health consequences of tobacco use, training in refusal skills. Smoking control policies for schools were encouraged. Children in intervention schools wrote letters to their fathers asking them to quit smoking, and monitored their smoking behaviour Control: usual curriculum.	
Outcomes	At 8 months:Self report of smoking cessation by smoking fathers, at interview with health educator	
Type of intervention	1. Community-based	
Notes		
Risk of bias		
Bias	**Authors' judgement**	**Support for judgement**

Zhang 1993 (*Continued*)

Random sequence generation (selection bias)	High risk	No randomization reported
Allocation concealment (selection bias)	High risk	See above
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	No information on missing data reported
Blinding of outcome assessment (detection bias) All outcomes	High risk	Self-report only, differential misreport possible

CO: carbon monoxide
CPD: cigarettes per day
CT: controlled trial
ETS: environmental tobacco smoke
IgE: Immunoglobulin E
min: minute(s)
RCT: randomized controlled trial

Characteristics of excluded studies *[ordered by year of study]*

Study	Reason for exclusion
Philips 1990	Met main inclusion criteria but the outcome measure was the report by kindergarten students of their intent to avoid cigarette smoke (leave the room themselves or ask an adult smoker to stop smoking). This outcome measure is believed by the authors to be too unreliable to include this study
Meltzer 1993	Multiple-baseline, quasi-experimental design.
Murray 1993	Longitudinal study.
Campion 1994	The outcomes are assessed by 2 surveys carried out before and after the campaign. This study targeted pregnant women
Wilson 1996	Baseline results only.
Manfredi 1999	This study targets predominantly women, some of whom were mothers
Cookson 2000	Before and after study.
Spencer 2000	Pilot study only. No further results available.
Emmons 2000	Quasi-experimental historical comparison design.

(*Continued*)

Arborelius 2001	Longitudinal study.
Okah 2003	Secondary analysis of an RCT of bupropion for smoking cessation
Badger 2003	Conference abstract only. Authors contacted and no further study information provided
Morgan 2004	Does not include outcome data related to ETS.
Loke 2005	Intervention targets pregnant women and their non-smoking spouses during perinatal period only
Turner-Henson 2005	Intervention not described.
Stepans 2006	Pilot study only.
Burmaz 2007	Minimal data on smoking at either baseline or follow up as smoking only very small component of intervention
Klinnert 2007	Does not include outcome data related to ETS.
Oien 2008	Study objective to assess the impact of an intervention on parental smoking during pregnancy
Hovell 2011	Intervention aimed at preteens themselves, not families or caregivers
Gadomski 2011	Uncontrolled study; no outcome data for control, only three versions of the intervention
Kegler 2012	Pre-post study, not a controlled study.
Winickoff 2013	Does not include outcome data related to ETS, but related to implementation of an intervention

Characteristics of ongoing studies *[ordered by year of study]*

Sockrider 2003

Trial name or title	Project PANDA (Parents and Newborns Developing and Adjusting)
Methods	RCT
Participants	485 pregnant women at 28 week gestation reported *not* having smoked in the last 28 days, but had a history of smoking before pregnancy
Interventions	Intervention: Mothers received 1 video and 5 newsletters; partners received a different set of videos and newsletters; all information was distributed by mail between 28 week gestation and 6 weeks postpartum. Newsletters included information on protecting the infant from ETS, tips on relapse prevention and a sign to designate the home as smoke free. Control: Usual care, would have received messages about ETS exposure as part of standard counselling from the paediatric care provider or community education

Sockrider 2003 (*Continued*)

Outcomes	Home Smoking Control Index: 4 interview questions, responses classified home into 1 of 3 categories regarding their home smoking policy. Reported tobacco smoking in the home: estimate of average number of hours smoking in the home each day Validation of self-reported smoking in the home: passive nicotine monitors used to validate self report
Starting date	Note first paper published, no ETS results as yet.
Contact information	Dr M Sockrider
Notes	Email contact with authors, no response

Wilson 2005

Trial name or title	Cincinatti Asthma Prevention (CAP) Study
Methods	Baseline study results only available. Full intervention details not yet reported
Participants	222 children who have been diagnosed with asthma by physician and are exposed to 5+ CPD, in or around the home. Home has electricity and family have no plans to move in the next 12 months
Interventions	Not yet reported.
Outcomes	ETS exposure self report ETS exposure biological verification with hair and serum samples tested for cotinine Housing characteristics collected by an environmental technician and collection of level of particulate matter Race and sociodemographic covariates
Starting date	Part of ongoing CAP study
Contact information	Dr Stephen Wilson
Notes	Email contact with author, no response

Chan 2006b

Trial name or title	Implementing smoking hygiene policies in households with infants exposed to secondhand smoke: intervention targeted at non-smoking mothers
Methods	RCT
Participants	208 Chinese families with non-smoking mother, smoking father and infant living together in the same household, and attended a maternal and child health centre
Interventions	Multi-step family smoking cessation intervention delivered onsite by a nurse smoking cessation counsellor. Mothers given guidelines and motivated to implement the household no-smoking policy

Chan 2006b (*Continued*)

Outcomes	Implementation of household no-smoking policy
Starting date	2005
Contact information	Dr Sophia Chan
Notes	Email contact with author - nil further available.

Ortega 2010

Trial name or title	BIBE study
Methods	Multi-centric cluster randomised field trial
Participants	Smoking mother or father with an infant aged under 18 months in Catalonia
Interventions	Brief primary care intervention based on counselling, cognitive theory and motivational interviewing
Outcomes	Questionnaire looking at ETS exposure during six month follow-up, nicotine in hair of babies
Starting date	March 2009
Contact information	Carlos Martin Cantera
Notes	Study results not yet available

Johnston 2010

Trial name or title	The study protocol for a randomised controlled trial of a family-centred tobacco control program about environmental tobacco smoke (ETS) to reduce respiratory illness in Indigenous infants
Methods	Parallel RCT
Participants	Indigenous women from Australia and New Zealand, and their infants recruited at 0-5weeks age, and followed-up until 12months of age, where the mother herself smokes or someone else in the household is a smoker
Interventions	Face-to-face home visits. Indigenous model of health promotion - information provision, health education, behavioural coaching for the women. For other smokers in the household - smoking cessation advice, counselling and treatment options
Outcomes	Infant medically attended acute respiratory illness Hospitalisations for infant acute respiratory illness Infant urinary cotinine Caregiver's self-report of infant tobacco smoke exposure Caregiver's report of home and car smoking bans

Johnston 2010 (*Continued*)

	Caregiver's self-report of smoking cessation Caregiver's self-report of number of quit attempts Process indicators
Starting date	2009
Contact information	Vanessa Johnston
Notes	Study results not yet available

Rosen 2011

Trial name or title	Project zero exposure
Methods	Three stage approach: Stage one is intervention development, stage two is intervention pilot and stage three is a cluster RCT
Participants	Parents who smoke with a child under three years of age
Interventions	Developing a theory-based intervention based on social marketing - try to convince to stop smoking, (or) stop smoking around the child. Will have group support sessions, feedback of biochemical result of child tobacco smoke exposure, project website, video simulation game and giving study information to the participant's physician
Outcomes	Child tobacco smoke exposure assessed by hair nicotine Parental report of child tobacco smoke exposure Adoption of voluntary home and car smoking bans Child respiratory symptoms Parental smoking cessation
Starting date	Unclear
Contact information	Dr L J Rosen
Notes	Study results not yet available

Chan 2012

Trial name or title	A randomised controlled trial of a family intervention to reduce SHS exposure in children
Methods	RCT
Participants	Households with an infant aged under 18 months where there was a smoking father and non-smoking mother
Interventions	Multi-level, theory based intervention, recruited from 22 maternal and child health centres in Hong Kong. Empowerment intervention for the mother and smoking cessation counselling for the father

Chan 2012 (*Continued*)

Outcomes	Fathers: Self-reported 7-day point prevalence quit rate, household smoking abstinence, cost per quitter Mother: Implemented complete household non-smoking policy, saliva cotinine Infant: Reduction of hospitalisation, cost per hospitalisation reduction, saliva cotinine
Starting date	Data collection from June 2008
Contact information	Contact vis Prof. Sophie Chan
Notes	Limited information available through conference posters only at the time of review

Hutchinson 2013

Trial name or title	PREPASE (PREvent PAssive Smoke Exposure)
Methods	RCT
Participants	Families with children (0-13 years of age) having an asthma predisposition who experience passive smoke exposure at home
Interventions	A motivational interviewing tailored programme including urinary cotinine feedback, with six sessions. Based on the principles of the reasoned action model
Outcomes	The primary outcome measure is the percentage of families curtailing passive smoking exposure in children (parental report verified with the urine cotinine concentrations of the children) after 6 months The secondary outcome measures include: household nicotine level, the child's lung function, airway inflammation and oxidative stress, presence of wheezing and questionnaires on respiratory symptoms, and quality of life
Starting date	Unclear
Contact information	On paper: Contact via Sasha Hutchinson
Notes	Not contacted for this update

Stotts 2013

Trial name or title	Baby's Breath II
Methods	RCT
Participants	Primary caregivers of NICU infants who were born at LBW (<2500 g) or ventilated for more than 12hours, who smoke or live with at least one smoker
Interventions	Motivational interviewing (two hospital based and two home based sessions lasting 30-45 minutes). Those in the intervention arm are entered into "fishbowl" prize draw if they attend the sessions, and have infant urine cotinine showing low or no secondhand smoke exposure. The participants and up to two other household

	members can withdraw from the "fishbowl" and receive gift cards of varying value
Outcomes	Primary outcome: Infant SHSe (surface nicotine wipes; passive sampling diffusion filters; saliva cotinine levels; home and car smoking ban assessment) Infant health outcomes and healthcare utilization (acute lower respiratory illness; persistent lower respiratory symptoms; acute care medical visits; re-hospitalization; emergency department visits; intensive care unit admissions) Household smoking (parental smoking; number of household smokers; Fagerstrom test of nicotine dependence for participants who smoke)
Starting date	Unclear
Contact information	On paper: Contact via Angela Stotts
Notes	Not contacted for this update

DATA AND ANALYSES

Comparison 1. Results

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Main outcomes			Other data	No numeric data

Analysis 1.1. Comparison 1 Results, Outcome 1 Main outcomes.

Main outcomes

Study	
Abdullah 2005	Counselling strategies based on the stages of change component of Prochaska's transtheoretical model. Results as n (%), intervention n=444, control n=459. Biochemically validated quit rate: Intervention 47 (10.6) Control 21 (4.5) Had not quit but had reduced intake: Intervention 145 (32.6) Control 83 (18.1) Stopped smoking for at least 24 hours: Intervention 145 (32.7) Control 136 (29.7) Complete restriction: Intervention 113 (24.6) Control 151 (34.1) Partial restriction: Intervention 278 (62.7) Control 259 (56.4) No measure of children's exposure or absorbtion via cotinine
Armstrong 2000	Targeted disadvantaged mothers. Smoking in house around infant (maternal self report verified by researcher observation during home visit) Intervention 8.6% v Control 23.8% (P<0.05). included education about smoking near infants as a Sudden Infant Death Syndrome (SIDS) prevention strategy in a post-natal nurse home visiting programme aimed to improve the quality of maternal-child attachment, maternal health and child health parameters. At four months the intervention group had significantly more completed immunizations than the controls, although both groups had high immunization rates. At 12 months there was no statistically significant difference between the groups for immunization status. There was also no significant difference at four or 12 months for rates of utilisation of community services
Baheiraei 2011	Motivational Interviewing used. In 3 months geometric mean urinary cotinine: intervention decreased from 48.72ng/mg to 28.68ng/mg, control decreased from 40.43 to 36.32ng/mg, differences between two groups statistically significant using one tailed t-test Greater decrease in total daily cigarette consumption in the presence of child in the intervention group than the control group (statistically significant with one tailed t-test) Intervention median cigarettes at 3 month 0 (IQR 1-2.71), control 1 (IQR 0-3.21) Home smoking bans: intervention 15% to 33.3% (statistically significant increase), control 11.5% to 19.5% (not statistically significant increase), differences between two groups statistically significant using a one tailed t-test Car smoking bans in the intervention group increased from 4% to 8%, and didn't change in the control group. This was not a statistically significant difference
Borrelli 2010	Latino families targeted. Used two interventions with different theoretical frameworks: one intervention used motivational interviewing, whilst the other intervention used the social cognitive theory. At 3 months 61.7% home monitors were returned and 98.8% were in good condition, whilst 60.9% child monitors returned and 100% in good condition. Household air nicotine significantly decreased from pretreatment to the 3 month

Main outcomes (*Continued*)

	follow-up in the BAM condition, (baseline M=1.07, SE 0.19, and 3-month M=0.28, SE 0.11, p=0.01), whereas the decrease observed in the PAM condition was not statistically significant. Changes in secondhand smoke concentrations as assessed by the child monitors were not statistically significant Continuous abstinence at 3 months 12.3% BAM group and 19.1% PAM group (OR 1.68, 95 CI 0.64-4.37) The child's level of functional morbidity due to asthma decreased significantly (p <0.001) in both groups over time Secondhand smoke exposure as measured by monitors directly on the child did not show a significant decrease in either group
Butz 2011	Low income households targeted. No statistically significant differences in urinary cotinine between baseline and follow up by group After combining the air cleaner groups, children assigned to those groups had a significant increase in symptom-free days (SFDs) during the past 2 weeks (1.36 SFDs) compared with 0.24 SFDs for control group children from baseline to follow-up No statistically significant differences In air nicotine at baseline and follow-up by group Comparison of the combined air cleaner groups and the control group indicated that the combined air cleaner groups had significant mean differences in PM2.5 and PM2.5-10 levels from baseline to follow-up (mean differences for PM2.5: control, 3.5 [SD, 20.0]; combined air cleaner groups, -18.0 [SD, 33.2; P .001]; and for PM2.5-10: control, 2.4 [SD, 20.8]; combined air cleaner groups, -9.6 [SD, 16.0; P=.009])
Chan 2005	Motivational Interviewing used. No statistically significant evidence of effect. Quit rate at 1 month post intervention: Intervention 7.5% [95%CI: 0 to 21] v 2.5% [95% CI: 0 to 7] control NS Reduced smoking consumption by half (self report): Intervention: 15% Control: 10% NS Reported quit attempts in last 30 days: Intervention 20% Control 7.5% NS Moved up the stage of readiness to quit: Intervention 17.5% Control 10% NS
Chan 2006a	Fishbein's theory of reasoned action and Ajzen's theory of planned behaviour used in the development of the educational intervention Three most frequently reported actions taken by the mother to protect the child from passive smoking at home: opening the windows (N=641, 43.9%), asking the father not to smoke near the child (N=608, 41.6%), and moving the child away from the smoke (N=482, 33%). Moved the children away when they were exposed to the fathers' smoke at home at 3-month follow up (78. 4% vs. 71.1%; P= 0.01) NS at 6 and 12 months. Number of smokers (excluding the father) living with the child at 12 month follow up (11%vs13% P=0.049) Smokers who smoked at home (Excluding Child's Father), at 12-month follow up (92% vs 93% NS) Child's ETS exposure at home by any smoker 3 months Intervention 37% vs Control 42% (P=0.02) 6mths 51% vs 53% P=0.48 12 mths 52% vs 58% P=0.03
Chellini 2013	Post-intervention smoke free homes were not significantly different between groups (increased in both): percentage increase in intervention group 12.7% and control group 11.1% (OR 1.04, 95 CI 0.47 to 2.28) For cars: intervention group 18.2%, and control group 12.0% (OR 1.47 95 CI 0.69 to 3.11. Of the N=131 smokers there was no significant difference in change of smoking habits. between intervention and control group (7% total stopped smoking, 5% stopped smoking indoors and n=9 stopped smoking in the car)
Chilmonczyk 1992	No evidence of effect. Intervention: 27/52 provided follow-up urine. Control 29/51 provided follow-up urine. Mean log urinary cotinine difference x100: Intervention group 2.05, control 2.17. P=0.26

Main outcomes (*Continued*)

Conway 2004	Participants (Latino families) for this study were recruited through advertising at community organisations and venues. Social learning model used. No significant effect. Hair nicotine (log ng/mg) 3mth Intervention 0.28, Control 0.32;12mth Intervention 0.23, Control0.23 NS Hair cotinine (logng/mg) 3mth Intervention 0.04, Control 0.04;12mth Intervention 0.02, Control 0.04 NS Parent report reduction: % confirmed reducers 3mth Intervention 52%, Control 46%; 12mth Intervention 61%, Control 56% NS
Culp 2007	At 12 months the intervention group smokers smoked mean 2.1 fewer than control, which was not statistically significant: intervention 7.28 (s.d. 6.79), control 9.41 (s.d.. 7.09) (t(147)=1.82, p=0.071) There were no significant differences between groups on number of hospital admissions or emergency room visits. At 12 months, intervention mothers were more likely to make use of health department clinics for well child care as compared to control group (chi square p=0.04) Knowledge of secondhand smoke exposure on child development: at 12 months significantly more intervention (n=90, 58.1%) than control (n=51, 47.7%) knew about SHS and impaired brain development, and significantly more intervention (n=126, 80.6%) than control (n=77, 72.0%) knew it takes longer to get well. No other significant differences with questions
Curry 2003	Ethnically diverse low income women targeted. Motivational Interviewing used. Abstinence rates: 3 mth Intervention 7.7% vs Control 3.4%; 12mth Intervention 13.5% vs Control 6.9% - 12 mth difference statistically significant. Serious attempt to quit at 12 months Adjusted OR 1.53 (95% CI 0.96 to 2.44) Ever quit for 24h at 12 months Adjusted OR 0.94 (95% CI 0.59 to 1.5) Prevalent abstinence 3 months Adjusted OR 2.40 (95% CI 0.85 to 7.8) 12 months Adjusted OR 2.77 (95% CI 1.24 to 6.60) Sustained abstinence (abstinent at 3 and 12 months) Adjusted OR 1.83 (95% CI 0.29 to 14.30) Validation of smoking cessation by carbon monoxide expiration was completed by only a small subsample (13/156 in the intervention group and 5/147 in the control group)
Davis 1992	This study recruited participants through an advertising campaign that invited them to call a telephone smoking cessation assistance counselling service run by the National Cancer Institute in the USA. No evidence of difference between self-help guides. Self-reported quit attempts: Guide 1 121/198 (61%), Guide 2 122/204 (60%), Guide 3 147/229 (64%); Self-reported abstinence for last week: Guide 1 28/198 (14%), Guide 2 24/204 (12%), Guide 3 27/229 (12%) P>0.05
Ekerbicer 2007	This study from Turkey recruited ETS exposed children from a primary school. Parents of identified children received telephone counselling or a note regarding their child's urinary cotinine result. At 9 months follow-up: Group one 74/93 students had urinary cotinine levels <10ng/ml; group two 69/93 had urinary cotinine <10 ng/ml. "The proportion of children with urinary cotinine values < 10ng/ml were statistically similar (p>0.05) in both groups"
Elder 1996	Social learning model used. No evidence of effect on tobacco-free school policy after 3 years: Intervention 78% of 56 schools, Control 75% of 40 schools

Main outcomes (*Continued*)

Emmons 2001	Motivational Interviewing used. Quit rates: Intervention 7.5%, Control 10.1%, P>0.05 CPD: no effect Kitchen and TV room air nicotine measured by passive sampling diffusion monitors at 6 months (log transformed units): Intervention 3.7 & 3.1 fell to 2.6 & 2.3, Control 3.0 & 3.5 changed to 6.9 & 3.5. * P<0.05,
Eriksen 1996	No evidence of effect. Quit smoking: Intervention 7/222 (3%) vs Control 1/ 221 (0.5%); Stopped indoor smoking 4/222 vs 4/ 221; Any positive change 32/222 (14%) vs 34/221 (15%)
Fossum 2004	Social learning model used. Self-reported smoking (number of cigarettes) 1 month before childbirth: Intervention 13.1 vs Control 10.8 NS; 3 months after childbirth Intervention 12.8 vs Control 8.2 (significant); Past 24 hrs Intervention 11.8 vs Control 7.8 (significant). Salivary cotinine: Mean for Intervention reduced from 185 ng/ml to 165; mean for Control increased from 245 to 346 ng/ml. Weak correlation between mother's reported rate of smoking and cotinine levels for both control and intervention groups
French 2007	Six month follow-up data Saliva cotinine verified non smoker: intervention (n=26, 22%), control (n=9, 10%) - p<0.025 Self-reported non-smoker: intervention (n=40, 33%), control (n=21, 22%) - p<0.10
Greenberg 1994	Social learning model used. Targeted ETS exposure in infants less than six months of age, and aimed to reduce the incidence of lower respiratory tract illness and the prevalence of respiratory symptoms. For infants of smoking mothers it demonstrated a lower prevalence of persistent symptoms in the intervention group (17.8%) compared with control group (30.9%; risk difference 13.1%; 95% CI: 1.0 to 27.0%). There was no difference in the incidence of illness. Parents report significant reduction in number of CPD: Intervention 12.5 CPD pre vs 7.7 CPD at 12month follow up, Control 12.3 CPD pre vs 13.3 at follow up P=0.01. Child urinary cotinine does not support this. Baseline mean urinary cotinine/ creatinine (nmol/mmol) Intervention 66 vs Control 51; at follow up Intervention 107 vs 98 Control. p=NS Prevalence of persistent lower respiratory symptoms Intervention 17.8%, Control 30.9% [difference 13.1%, 95% CI -1.0 to 27.0]
Groner 2000	No evidence of effect. Self-reported quit rates: Intervention Child Health Group 7/153, Mother's Health Group 4/164, Control 7/162. P=NS Self-reported CPD reduced in all groups; Self-reported not smoking indoors reduced: Intervention CHG 24, MHG 12, Control 13. P<0.05
Halterman 2011	Motivational Interviewing used. Symptom-free days/2 wk (difference) 0.96 (95 CI 0.39 to 1.52) Symptom nights/2 wk (difference) −0.63 (95 CI −1.09 to −0.18) Days with activity limitation/2 wk (difference) −0.44 (95 CI −0.87 to −0.02) Days with rescue medication use/2 wk (difference) −1.04 (95 CI −1.51 to −0.56) Days absent due to asthma/2 wk (difference) −0.22 (95 CI−0.36 to −0.07) ≥1 Visit for acute exacerbation of asthma (RR) 0.55 (95 CI 0.26 to 1.15)

Main outcomes (*Continued*)

Hannover 2009	Motivational Interviewing used. At 24 months follow-up Sustained abstinence: intervention (n=36, 12%, 95 CI 8.8-16.2), control (n=39, 11%, 95 CI 8.4-15.1), no statistically significant difference in proportions (0.7, 95 CI -4.2 to 5.8) Four week point prevalence: intervention (n=72, 24% 95 CI 19.6-29.2), control (n=67, 19%, 95 CI 15.6-23. 9), no statically signicant difference in proportions (4.7, 95 CI -1.7 to 11.1)
Herbert 2011	Recruited families to participate in the study through five public health nursing offices, eight daycare centres, and kindergartens on Prince Edward Island. Used a family-centred assessment and intervention model to empower families to reduce cigarettes smoked in the home. Those identified as having children exposed to ETS were then invited to participate in group counselling sessions. Intervention: decrease from median of 17 to 4.5 cigarettes/day and Control: decrease from 18.5 to 3.5 cigarettes/day. Both decreases statistically significant so did not detect a beneficial effect of the intervention. At 6 months follow-up intervention participants smoked 0.65 (95% CI -5.68, 6.98) more cigarettes per day compared to control participants
Hovell 2000	Reduction in parent-reported child exposure to cigarettes in the home and in total. At home reported exposure Intervention baseline 3.9 CPD, follow up 0.52 CPD vs Control 3.51 CPD baseline, 1.20 CPD follow up. The trend for parent-reported total CPD exposure was similar. Reports not supported by child urinary cotinine concentrations (ng/ml). Intervention baseline 10.93, follow up 10.47 vs Control baseline 9.43, follow up 17.47; 56% reduction (95% CI 48 to 63) Achieved a reduction in the number of parent-reported cigarettes smoked in the presence of children per day at 12 months, following a three-month intensive counselling intervention. There was, however, no change in cigarette smoke absorption as measured by children's urinary cotinine (ng/ml) for the intervention group over the 12 months (with measures collected at 3, 6 and 12 months). Cigarette smoke absorption for the control group increased from 9.4 ng/ml to 17.5 ng/ml over this time period, whereas there was almost no change in the intervention group (10.9 at baseline and 10.5 at 12 months). This increase in absorption observed for children in the control group appears to account for the apparent benefit of the intervention group. However the argument that this is solely due to reduced exposure in the home is uncertain, as the mothers in both the intervention and control groups reported falls in mothers' cigarettes smoked in the presence of the child from 3.9 to 0.5 (intervention) and 3.5 to 1.2 (control) cigarettes per day. In addition, they reported falls in total exposure to any source of cigarettes per day from 7.3 to 1.2 (intervention) and 7.2 to 2.8 (control). As the cotinine indicates a minimal fall for the intervention group and almost a doubling in urinary cotinine for the control group, either the cotinine measurement is unreliable or, more probably, that the parental report of cigarette exposure is not reliable
Hovell 2002	Latino families targeted. No significant effect. Decline in reported ETS exposure from (Intervention) 97% to 52% vs (Control) 93% to 69% at end of intervention (month 4). At follow up month 13, 9 months post-intervention (Intervention) 52% to 45% and (Control) 69% to 54%. Average parent-reported exposure levels declined over the follow-up period from 0.57 to 0.47 CPD (Intervention) and 1.11 to 0.71 CPD (Control). These results show a difference of mean 0.34 CPD reduction in exposure by report. Biological verification of child exposure reveals a less successful outcome. Child cotinine levels fell in the intervention group immediately post-intervention (month 4) 1.44 to 1.19 ng/mL, and rose in control group 1.17 to 1.35 ng/mL. Between end of intervention and follow up 9 months later levels fell 1.19 to.97 ng/mL (intervention) and 1.35 to 0.86 ng/mL (control). There was no significant difference in the mothers' rate of smoking cessation between groups

Main outcomes (*Continued*)

Hovell 2009	Low income households targeted. Behavioural ecological model used for development of the counselling intervention. Children's total SHSe showed a significant group by linear time interaction (p=0.012) and a linear time effect (p<0.001) from baseline to 6 months. Children's urinary cotinine showed no significant difference. Exposure from mothers in home (reported cigarettes/week) intervention 1.93 (95 CI 0.92-3.48) control 6. 16 (95 CI 3.61-10.12); total reported exposure (cigarettes/week) intervention 5.15 (95 CI 2.71-9.17) control 22.97 (95 CI 15.14-34.58); mothers smoking reported cigarettes/week intervention 77.91 (95 CI 64.22-91. 60) control 92.88 (95 CI 80.59-105.16); reported smoking by mothers indoors at home (cigarettes/week) interevntion 3.94 (95 CI 2.06-6.97) control 10.37 (95 CI 6.16-17.06); reported smoking by all indoors at home (cigarettes/week) intervention 6.46 (95 CI 3.16-12.40) control 19.18 (95 CI 11.15-32.52) Children's urinary cotinine concentration and mother's reported smoking showed a significant group main effect, but did not show a significant difference in rates between intervention and control groups at 18 months
Hughes 1991	Intervention to reduce children's ETS exposure in a study of a comprehensive asthma education intervention. The outcome was improved asthma control but no change in exposure to ETS. No evidence of effect on homes with smoker: Intervention baseline 60% of 47 homes, follow up 52% vs Control baseline 57% of 48 homes, follow up 51% P=NS
Irvine 1999	No evidence of effect. Mean decrease in child salivary cotinine (ng/ml): Intervention 0.70 vs Control 0.88. Difference= 0.19, 95% CI -0.86 to 0.48 Mean increase in mothers' salivary cotinine (ng/ml): Intervention 3.1 vs Control 1.8. Difference= 1.3, 95% CI -26.4 to 23.9 Self-reported quit attempts: Intervention 101/213 vs Control 97/222, P=NS
Kallio 2006	At child 8 years of age 10.1% (29/287) of mothers and 19.7% (43/218) fathers in the intervention group smoked regularly. The corresponding %s for the control group were 15.1% (45/298) mothers and 25.1% (60/ 239) fathers. Additionally 5.9% (17/287) of intervention group mothers and 8.3% (18/218) of intervention group fathers smoked occasionally compared with 5.7% (17/298) of control group mothers and 6.7% (16/ 239) of control group fathers (NS)
Kimata 2004	After 1 month urinary cotinine levels reduced 285±43 $ngmL^{-1}$ to 2.2±0.85 $ngmL^{-1}$ in AEDS cessation group, 257±31 $ngmL^{-1}$ to 1.8±52 $ngmL^{-1}$ in normal child cessation group and 274±42 $ngmL^{-1}$ vs 298±52 $ngmL^{-1}$ in control group of children with AEDS. AEDS children showed significant reduction in SCORAD index skin wheal (mm) from 9.9 baseline to 7.5; Control group 9.6 baseline to 9.3. Also significant changes in response to house dust mite & cat dander & lower neutrophil levels
Krieger 2005	Intervention guided by the transtheoretical stages of change model, as well as by social cognitive theory. Report that 20% of the sample quit smoking and that among smokers who did not go outside to smoke prior to intervention, a quarter did so after education, but data are not provided and it is unclear whether intervention outcomes were different between groups. Homes where smoking was reported as not allowed at baseline 80% (high intensity group) vs 76% (low intensity group) and at exit 77% (high) vs 80% (low) P=0.33 NS
McIntosh 1994	Number of smokers who moved outside: Intervention 7/30, Control 4/30. Not statistically significant. Urinary cotinine concentrations of children of subjects reportedly smoking outside are above 10.0 in 4/6 (range 6.7 to 54) in Intervention children tested, and in 3/3 (range 12.2 to 21.5) control children tested. These levels suggest significant ETS exposure

Main outcomes (*Continued*)

Nuesslein 2006	Calculated nicotine consumption Intervention: 12 micrograms to 4.65 micrograms vs Control: 12 micrograms to 7.5 micrograms NS Urinary cotinine levels Intervention 3520 ng/ml to 741 ng/ml vs Control 4572 ng/ml to 724 ng/ml P>0.05 NS Across the entire sample (both intervention and control groups) there was an overall reduction in self-reported smoking with average number of cigarettes smoked reduced from 17 to 10 per day and significant reduction in calculated nicotine consumption using self report data 12 micrograms to 5.5 micrograms (P<0.05), urinary cotinine 4101 ng/ml to 741 ng/ml (P<0.05)
Patel 2012	No significant differences between intervention compared to control groups in: Changed smoking policy: OR2.0 (95 CI 0.166 - 24.069) Reduced no. of cigarettes: OR 4.88 (95 CI 0.785 - 30.286) Quit smoking: OR 1.12 (95 CI 0.346 - 3.590)
Phillips 2012	Where both saliva cotinine and self-report were available, saliva cotinine was used. At eight weeks post-partum, there was a significantly more smoke free mothers in the intervention (81%) compared with the control group (46%) - p<0.001
Prokhorov 2013	Smoking status of smoker; 90% on baseline smokers in each group still using tobacco (n=36 intervention, n= 35 control) Results for the environmental monitors: two monitors - one in a "higher exposure" room than the other. In the high exposure room there was a significant main effect for time (p<0.001) and time by condition effect (p<0.05); for the intervention group the mean ambient nicotine level decreased from baseline at 12 months (1.14μg/m3 to 0.20μg/m3, p<0.01). There was a decrease in mean of control group but not significant (0. 55μg/m3 to 0.17μg/m3, p=.99), and a significant difference between average rate of change for intervention and control groups. In the low exposure there was a significant main effect for time but not time-by-condition and similar reductions in the intervention and control groups Percentage of households banning smoking at 12 months: 73% of the intervention group and 56% of the control group
Pulley 2002	Follow-up three weeks post-intervention Cigarettes/day: intervention 16.17 (sd 9.10), control 11.33 (sd 4.69) - p=0.132 Mothers in the intervention group smoked more at enrolment compared with control group, an effect not present at the 2 week visit (baseline) but present again three weeks post intervention Respiratory illness: intervention n=5 (42%), control n=6 (66%) - p=0.666
Ralston 2008	Counselling strategies based on the stages of change component of Prochaska's transtheoretical model. N=42, 33% (n=14) lost to follow-up The quit rate: 14% intervention, 5% control group which did not reach statistical significance
Ralston 2013	Differences between intervention and control groups were not significant (fisher's test): Self-reported quit - control 6/30 (20%, 95 CI 9-38&) and intervention 5/30 (17%, 95 CI 7-34%); any quit attempt during follow-up - control 11/30 (37%, 95 CI 22-55%) and intervention 16/30 (53%, 95 CI 36-70%); cut down - control 11/30 (27%, 95 CI 22-55%) and intervention 15/30% (15%, 95 CI 33-67%); used quitline - control 2/30 (7%, 95 CI 8-22%) and intervention 0/30 (0%, 95 CI 0-13%)
Ratner 2001	6 month Follow up: 36% abstinent, 26% occasional, 38% daily smoking. 76% homes smoke-free. 12 month Follow up: 20% abstinent, 35% occasional, 46% daily. 76% homes smoke-free

Main outcomes (*Continued*)

	No difference between groups. 6 month Follow up abstinence was 41% vs 30% (intervention vs control) but at 12 months abstinence was sustained in 21% vs 18.5% (intervention vs control) NS. Daily smoking at 6 months was 31% vs 45% (intervention vs control) but at 12 months was 41% vs 50% (intervention vs control). NS Abstinence reported as 38% vs 27% (treatment vs control) NS.
Schonberger 2005	At 6 month Follow up Maternal post-natal smoking Intervention 52% (14/27) vs. Control 28% (8/30) P=0.04 Partner smoking Intervention 31% (14/44) vs Control 20% 9/45) NS Smoking by others Intervention 47% vs Control 50% NS
Severson 1997	Cessation at 6 & 12 months: Intervention 25/1073 (2.3%), Control 10/802 (1.2%), P<0.05*, 1-tailed test Cessation at 12 months: Intervention 59/1073 (5.5%), Control 38/802 (4.7%) NS Only 35 of the 97 12-month quitters had quit by six months, with more early quitters in the intervention group (25/59) compared with the control group (10/38). Relapse prevention at 6 & 12 months: Intervention 200/609 (33%). Control 109/417 (26%), P<0.05*, 1-tailed test Relapse prevention at 12 months: Intervention 261/609 (43%), Control 163/417 (39%) * when controlling for other variables this effect was lost. Significant benefits of intervention on CPD, readiness to quit, likelihood of making a quit attempt, attitude towards smoking, knowledge of ETS effects on children
Stotts 2012	Lower rates of total smoking bans in the usual care-reduced measurement group (p<0.012 for total ban, p<0.01 for car) but not significantly different for home alone. 63.6% receiving motivational interviewing had a ban by 1 month post-discharged compared to 20% of the usual care group No significant differences in environmental nicotine monitors measurements
Tyc 2013	Group difference for average cigarettes smoked and child SHSe was not significantly different as the 12-month follow-up (p>0.05). Child SHSe was significantly lower at 12months from baseline for each group (p<0.05) . Children's urinary cotinine showed no significant difference, and did not change significantly over time in either group
Van't Hof 2000	There was no statistically significant difference in the smoking relapse rate between women in the intervention (41%) and control (37%) groups
Vineis 1993	Smoking cessation for mothers: Intervention 12/74 vs Control 10/84, OR 1.4, 95%CI 0.6 to 3.5 Smoking cessation for fathers: Intervention 18/173 vs Control 26/244 OR 1.0 showed a trend towards smoking cessation for mothers classified as white collar workers in the intervention arm (5/33) versus the control arm (2/36) (Odds Ratio [OR] 3.0; 95% confidence intervals [CI] 0.6 to 16.0) . No difference was detected for the other participants, comprising 80 blue collar mothers and a total of 411 men defined as white or blue collar workers
Wahlgren 1997	Intensive intervention was able to demonstrate a statistically significant but very small reduction in cigarette exposure from parents' cigarettes reported by parents without biological verification. Mean number of parent cigarettes smoked in presence of child fell in Intervention group: 5.8CPD baseline, 3.4CPD at clinic pre-intervention to 1.2 CPD at 6 months following completion of intervention. In control group, parent reported exposure fell from 8.0 baseline, 5.7 pre-intervention to 4.6 CPD at 6 month follow up. P for trend <0.01. The effect size was small, however, and curiously, the largest fall in this measure occurred in the period after

Main outcomes (*Continued*)

	recruitment but before the intervention. After the intervention, parents reported a reduction of 1.1 cigarettes per day smoked in the presence of the children for the control group, and 2.2 cigarettes per day for the intervention group. There was no validation by measurement of children's exposure or absorption via cotinine, or validation of the parental reports, and the clinical significance of such a fall is unclear Environmental monitor (1 room with heaviest child exposure) measured air nicotine (mcg/ cubic metre). Intervention group baseline 1.7, follow up 1.9 vs Control baseline 2.3, follow up1.4. Measured child asthma symptoms but found no sustained difference between groups for this measure
Wakefield 2002	Home smoking ban: Intervention 41% at baseline, 49% at Follow up vs Control 40% at baseline, 42% at Follwo up. Relative increase in bans not significant; P=0.40 Car smoking bans: Intervention baseline 33%, Follow up = 52%, Control baseline 37%, Follow up 48%, NS; Low rates of parental cessation, no difference between groups. Urinary cotinine measured for 209 children: Mean cotinine/ creatinine Intervention B = 22.8 nmol/mmol Follow up 21.0, Control baseline 25.7, Follow up 21.0, NS, P=0.40
Wiggins 2005	Mothers living in disadvantaged inner city areas targeted. No significant effect of either intervention. Support health visitor group vs control group, RR 0.86 (95% CI 0.86 to 1.19); Community support group RR 0.97 (95% CI 0.72 to 1.33). Reported no notable differences in child health outcomes for children receiving either post-natal support intervention
Wilson 2001	Of 51 children with complete urinary cotinine: creatinine ratio (CCR) data. Log CCR (ng/mg) Intervention baseline 1.82, Follow up 1.27 vs Control baseline 2.34, Follow up 1.93, adjusted Diff -0.38, adjusted P= 0.26. Proportion with >1 acute asthma visit/ year: Intervention baseline 50, Follow up 29.6, Control baseline 37.2, Follow up 46.5, OR 0.32, P=0.03 No significant differences in hospitalisation, prohibition of smoking in home, or smoking examined the effect of an intervention targeting smoking behaviour change and asthma education on health care utilisation and asthma hospitalisations, and explored other measures of asthma control. It demonstrated a reduction in the prevalence of children making more than one acute care asthma visit in the year following the intervention. Given that there was no apparent benefit of the smoking-related counselling on smoking-related outcomes, it is likely that it was the asthma education that achieved the improvement in asthma morbidity, rather than the smoking behaviour programme
Wilson 2011	Mean urinary cotinine creatinine ratio (CCR) decreased in both groups (not shown data for 6 and 12 month follow-up). The natural log of the urinary CCR decreased more in the intervention arm but it did not reach statistical significance (B coefficient -0.307 95 CI -0.633 to 0.018, p=0.64) Decrease in asthma symptoms at follow-up visits in both groups. The decrease in the intervention group did not reach statistical significance (B coefficient 0.035, 95 CI -0.208-0.277, p=0.78) At 12 months 84.0% of the intervention group (n=142) and 77.1% of the control group (n=131) had home smoking bans (p=0.11)
Winickoff 2010	Prevalence of self-reported 7 day abstinence 38% at baseline and 30% at follow up in the control group vs 31% at baseline and 30% at follow up in the intervention group (Effect size = 13% P=NS) Cotinine-confirmed 7 day abstinence for baseline current smokers NS. For baseline current smokers 18% in the control and 64% in the intervention group reported making a 24hr quit attempt by follow up (P=.005)

Main outcomes (*Continued*)

Woodward 1987	No evidence of effect. Mother self-reported quitting: Intervention 6%, Control 2.2%, P=0.25. Median infant urinary cotinine levels (mcg/litre): Intervention 11.0 (n=48) vs Control 10.0 (n=53), P=NS
Yilmaz 2006	Quit smoking: Child intervention group 24.3%; Mother intervention group 13%; Control 0.8%. (χ^2 = 29.5, P<0.0001) Smoking location change: Child intervention: 73%, Mother intervention: 46.6%, Control 11.6% (χ^2 =90.1, P<0.0001) Knowledge change (score on MCQ, possible score 0-100): mean post-intervention score in child intervention 63.51 (±7.35 - not stated whether these ± is standard deviations, or 95% confidence intervals) mother intervention 57.69 (±10.46) control 56.68 (±7.67) (ANOVA showed that these scores differed) P<0.0001 (Note: not an intention-to-treat analysis)
Zakarian 2004	Low income ethnically diverse population. Both groups showed significant decline in reported exposure to mother's cigarette's/week (intervention group 18.89 at baseline to 5.41 at 12 months, control group 13.25 at baseline to 5.23 at 12 months) (P<0.001). Total exposure to cigarettes/week (intervention group 53.2 at baseline to 21.99 at 12 months, control 54.48 at baseline to 18.22 at 12 months) (P<0.001) however, no significant difference between groups. Children's urinary cotinine concentration did not show a significant change over time in either group - No significant difference between groups
Zhang 1993	This was a study designed to increase public knowledge of the health consequences of cigarette smoking and to promote healthier attitudes among elementary school students in China, and encouraged these students to help their fathers to quit smoking. Schools in one district used a tobacco control curriculum, and the control group were students in another district. The other school-based study was a cardiovascular health promotion programme that included an intervention designed to limit children's ETS exposure and negative role modelling from staff and visitors smoking at school (Elder 1996). Conducted in the USA, this study used a cluster-randomized design with schools as the unit of allocation.Number (proportion) of smoking fathers: Intervention baseline 6843/9953 (68.8%) & follow up 60.7% vs Control baseline 6274/9580 (65.5%), follow up "approximately the same" [numbers are not stated] Proportion of fathers who quit smoking for at least 180 days: Intervention 800/9953 (11.7%), Control 14/6274 (0.2%)

APPENDICES

Appendix 1. MEDLINE (Ovid SP) search strategy

Searched April 2012	
1	exp Smoking/
2	Tobacco Smoke Pollution/
3	1 or 2
4	Smoking Cessation/
5	Environmental Medicine/
6	exp Environmental Pollution/
7	Public Health/
8	Health Education/
9	Health Promotion/
10	Psychotherapy/
11	4 or 5 or 6 or 7 or 8 or 9 or 10
12	exp Family/
13	Child Day Care Centers/ or Child Care/
14	Schools, Nursery/
15	(child* or carer* or caregiver* or parent* or brother* or sister* or sibling* or nanny or nannies) .ti,ab
16	12 or 13 or 14 or 15
17	3 and 11 and 16
18	limit 17 to ("newborn infant (birth to 1 month)" or "infant (1 to 23 months)" or "preschool child (2 to 5 years)" or "child (6 to 12 years)")
19randomisedd controlled trial.pt.	19randomisedd controlled trial.pt.
20	controlled clinical trial.pt.
21	randomized.ab.

(*Continued*)

22	placebo.ab.
23	drug therapy.fs.
24	randomly.ab.
25	trial.ab.
26	groups.ab.
27	19 or 20 or 21 or 22 or 23 or 24 or 25 or 26
28	Research Design/
29	Follow-Up Studies/
30	exp evaluation studies/
31	Prospective Studies/
32	Retrospective Studies/
33	Comparative Study/
34	Cross-Sectional Studies/
35	27 or 28 or 29 or 30 or 31 or 32 or 33 or 34
36	18 and 35
37	limit 36 to yr="2007 -Current"
38	(2011* or 2012*).yr,dp,ed.
39	37 and 38

Appendix 2. EMBASE (Ovid SP) search strategy

Searched April 2012	
1	*smoking/
2	*smoking cessation/

(*Continued*)

3	*environmental health/
4	*pollution/
5	*public health/
6	*health education/
7	*psychotherapy/
8	2 or 3 or 4 or 5 or 6 or 7
9	*family/
10	*schools/
11	*school/
12	*nursery/
13	*nurseries/
14	*day care/
15	*child care/
16	*house/
17	*home/
18	(carer* or caregiver* or parent* or famil* or brother* or sister* or sibling* or nanny or nannies).ti, ab
19	9 or 10 or 11 or 12 or 13 or 14 or 15 or 16 or 17 or 18
20	child/
21	newborn/
22	20 or 21
23	1 and 8 and 19 and 22
24randomisedd controlled trial/	24randomisedd controlled trial/
25randomisationn/	25randomisationn/
26	controlled study/

(*Continued*)

27	evidence based medicine/
28	clinical trial/
29	(clin* adj5 trial?).ti,ab.
30	((singl* or doubl* or trebl* or tripl*) adj5 (blind* or mask*)).ti,ab
31	placebos/
32	placebo*.ti,ab.
33	methodology/
34	comparative study/
35	"evaluation and follow up"/
36	prospective study/
37	(control* or prospective* or volunteer?).ti,ab.
38	24 or 25 or 26 or 27 or 28 or 29 or 30 or 31 or 32 or 33 or 34 or 35 or 36 or 37
39	23 and 38
40	limit 39 to yr="2007 -Current"
41	(2011* or 2012*).yr,dp,em.
42	40 and 41

Appendix 3. CINAHL (EbscoHOST) search strategy

Searched April 2012	
S31	S15 and S29 Limiters - Published Date from: 20110101-20121231; Age Groups: Infant, Newborn: birth-1 month, Infant: 1-23 months, Child, Preschool: 2-5 years, Child: 6-12 years
S30	S15 and S29 Limiters - Published Date from: 20070101-20111231; Age Groups: Infant, Newborn: birth-1 month, Infant: 1-23 months, Child, Preschool: 2-5 years, Child: 6-12 years

(*Continued*)

S29	S16 or S17 or S18 or S19 or S20 or S21 or S22 or S23 or S24 or S25 or S26 or S27 or S28
28	TI (control* pr prospectiv* or volunteer*) or AB (control* or prospectiv* or volunteer*)
S27	(MH "Evaluation Research")
S26	(MH "Comparative Studies")
S25	(MH "Study Design") OR (MH "Cross Sectional Studies") OR (MH "Prospective Studies+")
S24	TI random* or AB random*
S23	TI placebo* or AB placebo*
S22	(MH "Placebos")
S21	TI tripl* n5 blind* or AB tripl* n5 blind* or TI tripl* n5 mask* or AB tripl* n5 mask* or TI trebl* n5 blind* or AB trebl* n5 blind* or TI trebl* n5 mask* or AB trebl* n5 mask*
S20	TI doubl* n5 blind* or AB doubl* n5 blind* or TI doubl* n5 mask* or AB doubl* n5 mask*
S19	TI singl* n5 blind* or AB singl* n5 blind* or TI singl* n5 mask* or AB singl* n5 mask*
S18	TI clin* n5 trial* or AB clin* n5 trial*
S17	(MH "Random Assignment")
S16	(MH "Clinical Trials+")
S15	S1 and S9 and S14
S14	S10 or S11 or S12 or S13
S13	TI (child* or carer* or caregiver* or parent* or famil* or brother* or sister* or sibling* or nanny or nannies) or AB (child* or carer* or caregiver* or parent* or famil* or brother* or sister* or sibling* or nanny or nannies) or MW (child* or carer* or caregiver* or parent* or famil* or brother* or sister* or sibling* or nanny or nannies)
S12	(MH "Child Care+")
S11	(MH "Schools, Nursery")
S10	(MH "Family+")
S9	S2 or S3 or S4 or S5 or S6 or S7 or S8
S8	(MH "Psychotherapy")

(*Continued*)

S7	(MH "Health Promotion")
S6	(MH "Health Education")
S5	(MH "Public Health")
S4	(MH "Environmental Pollution+")
S3	(MH "Medicine, Environmental")
S2	(MH "Smoking Cessation")
S1	(MH "Smoking+")

Appendix 4. PsycINFO search strategy

Searched April 2012	
1	exp tobacco smoking/
2	Smoking Cessation/
3	Environmental Medicine/
4	exp pollution/
5	Public Health/
6	Health Education/
7	Health Promotion/
8	Psychotherapy/
9	2 or 4 or 5 or 6 or 7 or 8
10	exp Family/
11	exp health education/
12	day care centers/ or child day care/
13	Child Care/

(*Continued*)

14	(child* or carer* or caregiver* or parent* or famil* or brother* or sister* or sibling* or nanny or nannies).ti, ab
15	10 or 11 or 12 or 13 or 14
16	1 and 9 and 15
17	limit 16 to 100 childhood <birth to age 12 yrs>
18	limit 17 to yr="2007 -Current"
19	(2011* or 2012*).yr,dp.
20	18 and 19

Appendix 5. ERIC (Proquest) search strategy

Searched April 2012
su(smoking) AND (ab("smoking cessation") OR ti("smoking cessation")) AND (su(Pollution) OR su(Environmental influences) OR su(Public health) OR su(health education) OR su(health promotion) OR su(psychotherapy)) AND ((SU(family sociological unit) OR SU(parents) OR SU(child care) OR SU(Nursery schools)) OR pub(child* OR carer* OR caregiver* OR parent* OR brother OR sister* OR sibling* OR nanny OR nannies OR family*) OR ab(child* OR carer* OR caregiver* OR parent* OR brother OR sister* OR sibling* OR nanny OR nannies OR family*))

Appendix 6. Cochrane Library (Wiley) search strategy

Searched April 2012
#1 MeSH descriptor Smoking explode all trees #2 MeSH descriptor Tobacco Smoke Pollution explode all trees #3 (#1 OR #2) #4 MeSH descriptor Smoking Cessation explode all trees #5 MeSH descriptor Environmental Medicine explode all trees #6 MeSH descriptor Environmental Pollution explode all trees #7 MeSH descriptor Public Health, this term only #8 MeSH descriptor Health Education, this term only #9 MeSH descriptor Health Promotion, this term only #10 MeSH descriptor Psychotherapy, this term only #11 (#4 OR #5 OR #6 OR #7 OR #8 OR #9 OR #10) #12 MeSH descriptor Family explode all trees #13 MeSH descriptor Schools, Nursery explode all trees

(*Continued*)

#14 MeSH descriptor Child Care, this term only
#15 MeSH descriptor Child Day Care Centers explode all trees
#16 (child* or carer* or caregiver* or parent* or famil* or brother* or sister* or sibling* or nanny or nannies):ti,ab,kw
#17 (#12 OR #13 OR #14 OR #15 OR #16)
#18 (#1 AND #11 AND #17), from 2007 to 2011
#19 (#1 AND #11 AND #17), from 2011 to 2012

WHAT'S NEW

Last assessed as up-to-date: 8 August 2008.

Date	Event	Description
26 March 2014	Amended	Contact changed to Ruchi Baxi
26 March 2014	Amended	date changed for 'Assessed as Up-to-date'.

HISTORY

Protocol first published: Issue 3, 1999

Review first published: Issue 3, 2003

Date	Event	Description
18 December 2013	New search has been performed	Review update: 21 studies added, date of last search September 2013
18 December 2013	New citation required but conclusions have not changed	Additional authors
22 June 2011	Amended	Additional table converted to appendix to correct pdf format
8 August 2008	New search has been performed	Review Update.
3 July 2008	New citation required but conclusions have not changed	Additional authors

CONTRIBUTIONS OF AUTHORS

RB was involved in coordinating the current review update, extracted data and co-wrote and edited the current review update.

MS was involved in coordinating the current review update, extracted data and co-wrote and edited the current review update.

PW was involved in coordinating the current review update, developing the original review and previous update, extracted data for the original and previous update, and edited the original review and the updates.

RR was involved in coordinating the original review, wrote the original review, and extracted data for the original review and the updates, and edited the updates.

AP was involved in the development, data extraction and editing of the original review and updates.

EW was involved in coordinating the original review and the updates, extracted data for the original review, and edited the original review and the updates.

NP was involved in coordinating the previous update, wrote the previous update, and extracted data for the previous and current updates.

NS was involved in the development, and data extraction for the original review and previous update, and involved in editing of the original review and updates.

DECLARATIONS OF INTEREST

No conflict of interest known.

SOURCES OF SUPPORT

Internal sources

- The McCaughey Centre, Melbourne School of Population Health, University of Melbourne, Australia.

External sources

- National Health & Medical Research Council, Australia.
- Murdoch Children's Research Institute, Australia.
- VicHealth (Victorian Health Promotion Foundation), Australia.

DIFFERENCES BETWEEN PROTOCOL AND REVIEW

Some secondary outcomes removed from methods section in most recent version, as not addressed in recent versions or in current version. These are:

- Knowledge, attitudes and beliefs of carers about the effects of passive smoking or ETS for self or children
- Participants' views of the intervention
- Measures of anxiety, depression, guilt, stress/locus of control, health, and well-being/health-related quality of life
- Measures of family functioning

INDEX TERMS

Medical Subject Headings (MeSH)

*Caregivers; *Family; Age Factors; Controlled Clinical Trials as Topic; Environmental Exposure [prevention & control]; Smoking [*prevention & control]; Smoking Cessation; Tobacco Smoke Pollution [*prevention & control]

MeSH check words

Child; Child, Preschool; Humans; Infant; Infant, Newborn