NICE RAPID REVIEW

The Impact of Quitlines on Smoking Cessation

First Draft

1 April 2007

November 2021: NICE guidelines PH10 (February 2008) and PH14 (July 2008) have been updated and replaced by NG209.
The recommendations labelled [2008] or [2008, amended 2021] in the updated guideline were based on these evidence reviews.
See www.nice.org.uk/guidance/NG209 for all the current recommendations and evidence reviews.

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1. Executive Summary

This review contains assessments of the available evidence on the impact of quitlines on smoking cessation. A comprehensive literature search was conducted and a total of 984 titles and abstracts were screened, with 32 studies identified as direct evidence.

Results: overall, the quality of evidence on the impact of quitlines on smoking cessation is reasonably high. There is evidence that reactive quitlines improve abstinence rates over the distribution of self-help materials alone and there is also a consistent body of evidence that proactive telephone counselling has a modest effect on smoking cessation. Although it is difficult to evaluate the comparative effectiveness of proactive and reactive interventions, there is some evidence that proactive support may be slightly more effective – although further research is needed in this area. There is strong evidence that multiple follow-up calls have a modest effect on smoking cessation.

Although there is evidence of the effectiveness of quitlines, not all populations of smokers utilise them equally. There is consistent evidence that women are overrepresented in calls to quitlines and that quitlines attract younger smokers as well as smokers who are more heavily addicted. There is some evidence that quitline callers are more likely to occupy a lower social class position.

A substantial number of controlled studies have been conducted which explore the effectiveness of telephone counselling for particular subpopulations. Overall, the evidence regarding the impact of telephone counselling on young smokers is inconclusive. The evidence regarding the impact of telephone counselling on low income smokers is more consistent and suggests that telephone counselling is effective in facilitating short-term cessation in low-income smokers, but that treatment effect may lessen over time. Telephone counselling for pregnant smokers, on the other hand, does not have proven efficacy; however, there is some evidence that telephone counselling appears to have a greater impact on light smokers than heavy smokers. Further research needs to be conducted into the effectiveness of telephone counselling for minority ethnic groups as the existing limited evidence is inconclusive.

There is evidence that the effectiveness of telephone counselling varies for different population groups and older smokers, women and heavier smokers appear to be less likely to quit smoking than other groups of smokers. There is also evidence that some telephone interventions are more effective than others for different population groups such as women and men.

The literature search did not produce any studies that describe negative unintended outcomes of quitlines. However, quitlines may have unintended positive impacts beyond those which can be measured by quit rates amongst callers, as they symbolically reinforce the importance of smoking cessation to smokers and may also increase quit attempts amongst users and non-users – who know that they can turn to the quitline for help if necessary.

Although many studies are based on the premise that telephone quitlines are highly cost effective, relatively few researchers have systematically explored the cost effectiveness of telephone quitlines. However, the limited available evidence indicates that they are cost-effective when marketed to large populations.

EVIDENCE STATEMENTS

No	Statement	Grade	Country/s	Evidence
1	Two 1+ studies found that reactive quitlines improved abstinence rates over the distribution of self-help materials alone. Three 2+ studies provide further support for the effectiveness of quitlines, and found self-report 12-month abstinence rates of between 8.2% to 15.6%. As two of these studies took place in the UK, and results are broadly consistent across studies, these findings are likely to be directly applicable to a UK setting	Two 1+ studies, three 2+ studies	USA and UK	Ossip-Klein et al. 1991 (1+); Zhu et al. 2002 (1+); Owen 2000 (2+); Swartz et al. 2005 (2+); Platt et al. 1997 (2+)
2	The literature search failed to produce any studies that systematically explore the additive effect of offering counselling as well as verbal information to callers accessing quitlines.			
3	There is strong evidence from a 1++ Cochrane Review and one 1+ meta-analysis that proactive telephone counselling has a modest effect on smoking cessation. As these reviews are international in scope their findings are likely to be applicable to a UK setting.	One 1++ Cochrane Review and one 1+ meta-analysis	International	Stead et al. 2006 (1++); Lichtenstein et al. 1996 (1+)
4	Although there is limited available evidence regarding the comparative effectiveness of proactive and reactive quitlines, one 2+ study found that self-reported 12-month abstinence rates were somewhat higher for proactive compared with reactive support – although the difference was not statistically significant. Although the study was conducted in Northern Europe, its results are likely to be broadly applicable to a UK setting.	One 2+ study	Sweden	Helgason et al. 2004 (2+)
5	A Cochrane Review (rating 1++) provides strong evidence that multiple follow-up calls (3-6 calls) have a modest effect on smoking cessation (OR 1.38, 95% CI 1.23 to 1.55). As the Cochrane review is international in scope these findings are likely to be directly applicable to	One 1++ Cochrane Review	International	Stead et al. 2006 (1++)

	a UK setting.			
6	There is no evidence regarding the greater effectiveness of one counsellor type compared with others. However, it is unclear whether this is because all counsellor types are equally effective or merely because no research has been conducted into this specific issue.			
7	Four 2+ studies and two 3+ case reports provide strong evidence that women are overrepresented in calls to quitlines. There is also reasonably consistent evidence that quitlines attract younger smokers as well as smokers who are more heavily addicted. Two of the 2+ studies also provide some evidence that quitline callers are more likely to occupy a lower social class position and one of the 3+ studies indicates that certain minority ethnic groups are overrepresented in calls to a quitline, although overall minority callers are slightly underrepresented. As three of the studies were conducted in the UK and results are broadly consistent across all studies, these findings are directly applicable to a UK setting.	Four 2+ studies and two 3+ case reports	UK and USA	Gilbert, Sutton & Sutherland 2005 (2+); Owen 2000 (2+); Platt et al. 1997 (2+); Swartz et al. 2005 (2+); Prout et al. 2002 (3+); Zhu et al. 2000 (3+)
8	No studies were identified in the literature search that directly addressed whether quitline callers found other services unappealing or inappropriate. However, a 2+ study suggests that younger individuals may be unwilling or unable to attend a clinic for cessation assistance and may prefer calling confidential quitlines. As this is a UK study, its findings are directly applicable to a UK setting.	One 2+ study	UK	Gilbert, Sutton & Sutherland 2005 (2+)
9	No studies were identified in the literature search that addressed the views of those receiving and delivering the intervention.			
10	Overall, the evidence regarding the impact of telephone counselling on young smokers is inconclusive. A 1+ study failed to find evidence of a significant telephone counselling effect on teenage smokers at 4- and 8-month follow up, although the direction of change was positive.	One 1+ study and one 1- study	USA	Lipkus et al. 2004 (1+); Rabius et al. 2004 (1-)

	However, a 1- study found that telephone counselling was the key predictor of abstinence in younger smokers (age 18-25) at 3-month follow up. Although the studies are American, their findings are likely to be broadly applicable to a UK setting.			
11	Four 1+ studies found telephone counselling to be effective for particular subpopulations of low income smokers at 3-month follow up. However, two of these studies followed up participants beyond 3 months and failed to find evidence of a treatment effect at 6-months – although a fifth 1++ study did find evidence of a treatment effect at 6 months. A sixth 2+ study failed to find evidence of a significant treatment effect at 12 months, although the direction of change was positive. Overall, the evidence suggests that telephone counselling is effective in facilitating short-term cessation in low-income smokers, but that the treatment effect may lessen over time. As some of the studies deal with very specific low-income populations and none of the studies are British, it is unclear how applicable these findings are to a UK setting.	One 1++ study, four 1+ studies and one 2+ study	USA	Osinubi et al. 2003 (1+); Vidrine et al. 2006 (1++); Wadland et al. 2001 (1+); El-Bastawissi et al. 2003 (2+); Solomon et al. 2000 (1+); Solomon et al. 2005 (1+)
12	One 1++ study and four 1+ studies uniformly conclude that telephone counselling does not have proven efficacy for pregnant smokers over and above self-help materials or brief advice from a physician. However, several studies demonstrate the direction of change in abstinence rates is positive, and there is some evidence that telephone counselling appears to have a greater impact on light smokers than heavy smokers. Although the studies were conducted in the USA, their results are likely to be broadly applicable to a UK setting.	One 1++ study and four 1+ studies	USA	Rigotti et al. 2006 (1++); Stotts et al. 2002 (1+); McBride et al. 1999 (1+); Solomon et al. 2000 (1+); Ershoff et al. 1999 (1+)
13	Further research needs to be conducted into the effectiveness of telephone counselling for minority ethnic groups as the existing limited evidence is inconclusive. A 1-	One 1+ study and one 1- study	USA	Lipkus et al. 1999 (1-); Wetter et al. 2007 (1+)

	study found that the addition of telephone counselling did not improve the effectiveness of a smoking cessation intervention aimed at African American smokers above and beyond a provider-prompted intervention and self-help materials. A second 1+ study found that enhanced telephone counselling for Hispanic smokers did significantly increase abstinence rates, when demographic and smoking-related variables were controlled. As these studies were conducted in the USA, which has a different ethnic composition to the UK, their results are not directly applicable to a UK setting.			
14	There is evidence from a 1+ meta-analysis that older, female and heavier smokers are less likely to quit smoking as a result of proactive telephone counselling than other population groups. As the review is international in scope, its findings are broadly applicable to a UK setting.	A 1+ meta-analysis	International	Pan 2006 (1+)
15	Overall, there is evidence from a 1+ study and a 2+ study that some telephone interventions are more effective than others for different population groups such as women and men. Although these studies were conducted outside of the UK, their findings are likely to be broadly applicable to a UK setting.	One 1+ study and a 2+ study	USA, Sweden	Mermelstein et al. 2003 (1+); Helgason et al. 2004 (2+)
16	Two studies highlight possible positive unintended outcomes of quitline interventions. First, a 3+ study speculates that quitlines symbolically reinforce the importance of smoking cessation to smokers. Second, a 1+ study speculates that the existence of a quitline increases quit attempts amongst users and possibly also amongst non-users – who know that they can turn to the quitline for help if necessary. Although these studies were conducted outside of the UK, their findings are likely to be broadly applicable to a UK setting.	A 1+ study and a 3+ case report	USA, Australia	Ossip-Klein et al. 1991 (1+); Wakefield & Borland 2000 (3+)

17	Although further research is needed regarding the cost-effectiveness of quitlines, a cost effectiveness analysis of the Swedish national quitline (+ rating) found it to be particularly cost effective: the researchers calculate the cost per year of life saved as equivalent to $USD311-401. A 2+ study of the cost of quitlines also deems them to represent a very modest expense for governments that provide these services, although a 3+ case report warns that services need to be marketed to large populations to be effective. Although these studies were conducted outside of the UK, the costs of running a national quitline are likely to be similar from one country to the next. Therefore, their findings are likely to be broadly applicable to a UK setting.	One + rating economic evaluation, one 2+ study and a 3+ case report	Sweden, USA	Tomson, Helgason & Gilgam 2004 (+ rating); Keller et al. 2007 (2+); Glasgow et al. 1993 (3+)

2. Background

Cigarette smoking is the leading cause of preventable death in the United Kingdom today. In England alone, between 1998-2002 smoking was estimated to be responsible for 86,500 deaths per year (Twigg, Moon, Walker 2004) and currently costs the National Health Service (NHS) between approximately 1.4-1.5 billion pounds annually, from health care expenditure on smoking-induced disease to sickness/invalidity benefits, widows' pensions and other social security benefits for dependants (Parrot, Godfrey 2004).

A recognition of the negative health and economic impacts of smoking has led to the implementation of a variety of population-level efforts to reduce smoking prevalence, which include measures to prevent the uptake of smoking (through cigarette taxes, bans on tobacco advertising) and limit tobacco consumption (through the implementation of smoke-free legislation) as well as the provision of treatment services for smokers intending to quit. While clinic-based treatment is the classic form of intervention for smokers, another treatment mechanism that is increasingly available to smokers is telephone quitlines.

Telephone quitlines first emerged in the 1970s as a broad, population-based approach to smoking cessation (Lichtenstein et al. 1996) and have since been adopted in a number of countries, including Denmark, France Germany, Iceland, Ireland, Italy, Netherlands, Norway, Poland, Portugal, Spain, Sweden, Switzerland, the United Kingdom, Australia and New Zealand (Ossip-Klein, McIntosh 2003). However, quitlines (also known as 'hotlines' or 'helplines') cover a wide range of services that tend to vary, sometimes dramatically, based on the amount of funding they receive and the location of treatment.

According to Ossip-Kline and McIntosh (2003), various quitline models include:

1) Embedding quitline services in broader health hotline services.
2) Providing smoking-specific quitlines where smokers who call speak directly with a counsellor.
3) Providing smoking-specific quitlines where callers hear a brief, taped daily message and then have the option to stay on the line and speak to a counsellor.
4) Providing callers with a telephone tree for services offering a variety of choices including materials, messages or counselling.
5) Having a counsellor screen calls and then offering services accordingly.

The specific services that quitlines might offer include: mailing out materials, offering referrals to other resources, providing information on nicotine replacement therapy (NRT), providing assistance with obtaining NRT, or offering reactive or proactive counselling (Ossip-Klein, McIntosh 2003). In proactive approaches counsellors initiate one or more calls to provide support in making quit attempts or avoiding relapse. In reactive approaches, the client initiates contact with the service to request support (Stead, Perera, Lancaster 2006). Although reactive quitlines generally respond only to client-initiated calls, in some models smokers may request counselling calls which are made from the call centre, which creates some overlap with the proactive approach (Stead, Perera, Lancaster 2006).

According to Ossip-Klein & McIntosh (2003), telephone quitlines have four major goals: 1) to provide direct services to help smokers to quit, increase the number of smokers making a quit attempt, 2) to provide access to information and counselling

for entire populations across wide geographic areas, 3) to provide broad access to tobacco interventions and target specific populations for interventions such as pregnant women, older adults, adolescents, and ethnic minority groups; and 4) to potentially reduce disparities in care.

It is clear that counselling via telephone hotlines or quitlines has the potential to reach large numbers of people as well as under-served populations (Stead, Perera, Lancaster 2006). However, telephone quitlines rely upon widely advertising their availability to generate calls from smokers (Wakefield, Borland 2000). Indeed, all quitlines face a key challenge to maintain a balance between promotion and utilisation; it is critical that necessary funding be spent on promotion to ensure adequate call rates that justify continuation of the quitline while not stimulating excessive demand that overwhelms the resources of the service (Ossip-Klein, McIntosh 2003).

2.1 The UK Quitline

In the United Kingdom, all smokers seeking support for quitting have access to two major quitlines: the NHS Smoking Helpline and Quitline. The NHS Smoking Helpline was launched in May 2000 and provides "expert, free, and friendly" advice to smokers and their families. The helpline is open between 7 am and 11pm daily for information requests and referrals, with unlimited access to trained, experienced and friendly advisors giving one-to-one advice and support. The service also distributes information materials and referrals to local Stop Smoking Services (http://www.bassetlaw-pct.nhs.uk/services/smoking_cessation/nhs_helpline.htm).
The NHS Smoking Helpline also offers five Asian Tobacco Helplines in Bengali, Urdu, Hindi, Punjabi, and Gujarati and the NHS Pregnancy Smoking Helpline[1] which aims to provide a specific service that addresses the needs and concerns of pregnant women and new mothers (http://www.quit.org.uk/).

Quitline, run by Quit (an independent charity), is a free telephone service which has provided smoking cessation advice and counselling since 1988 (Gilbert, Sutton 2006). Currently, the service is available between the hours of 9am to 9pm and is operated by approximately 130 trained counsellors. Unlike some telephone support services, Quitline has deliberately omitted a frontscreen, which allows callers to speak immediately to a counsellor (Gilbert, Sutton 2006). An important component of this service is the fact that calls are anonymous and confidential (Gilbert, Sutton 2006). Quitline also offers specific Quitlines for various populations. For example, Quitline counselling is offered in a variety of languages including Bengali, Urdu, Hindi, Punjabi, and Gujarati (http://www.quit.org.uk/). A recent report (Ali, Viswanathan, & Rizvi, 2006) has shown that the Healthy Ramadan campaign has a valuable role to play in increasing awareness of these helplines and the 2005 campaign significantly increased people's awareness of the Asian Quitline (increase from 21.3% to 30.3%) and the NHS quitline (from 32% to 39.3%).

A key aim of this review is to provide an analysis of the existing evidence on the effectiveness of quitlines in facilitating smoking cessation. It contains assessments

[1] This service has been contracted out to Quit. The helpline has been in operation since 2000, and started to operate a call back service in April 2001. Almost all callers are pregnant at the time of their call. Furthermore, the majority of callers are between the ages of 25-34. Quit provides 6 call backs throughout the course of a pregnancy and has found that between 13-48% of the callers have quit smoking at follow up (2006-2007 fiscal year). On average, women receiving callbacks reported that they were fairly-very helpful.

of the available data on the extent to which quitlines and telephone counselling stimulate and support smoking cessation, with a particular focus on their impact on subpopulations.

3. Methodology

3.1 Literature Search

Lindsay Richardson and Kirsten Bell conducted the literature searches for this rapid review in March 2007. The literature searches covered published studies in the following standard databases: Pubmed/Medline, DARE and Pyscinfo. Only studies published in English were included in this review. The database searches produced a total of 984 references once duplicates were removed (see Appendix A for a full description of search terms and processes).

3.2 Selection of Studies for Inclusion

Once the literature search was complete, the project team selected relevant studies based on the criteria outlined in section 4.1 of the *Public Health Guidance Methods Manual*. Before acquiring papers for assessment, preliminary screening of the literature search was carried out to discard irrelevant material. Titles were initially scanned by one reviewer who removed the clearly irrelevant studies. The remaining abstracts were independently scrutinised in relation to the research questions by two reviewers and those that did not directly deal with the issues raised in the research questions were eliminated. Once this sifting process was complete, paper copies of the selected studies or reviews were acquired for assessment.

3.2.1 Interventions

The review is international in scope and includes telephone interventions for smoking cessation where telephone support is the key intervention component, or is offered as an adjunct to a minimal intervention (e.g. the provision of physician advice or self-help materials) – although to be eligible for inclusion, it had to be possible to evaluate the telephone support independently of the other intervention components. Interventions whereby telephone support is offered as an adjunct to an intensive face-to-face intervention are not covered in this review. However, where telephone support is the main intervention, all variations in format were of interest: including: proactive counselling, reactive counselling, proactive and reactive counselling, message banks, etc. Text messaging support for smoking cessation is not covered in this review. Finally, studies that explore the impact of mass media campaigns on calls to quitlines have not been included in this review, unless they also address the outcomes of interest.

3.2.2 Outcomes

The key outcomes of interest were:

1. Analyses of the demographic profiles of callers to quitlines
2. Changes in smoking status following the intervention (with biochemical validation where recorded). The research team was particularly interested in literature that analysed these outcomes based on factors such as sex, social class, ethnicity, and age.

A recent Cochrane Review (Stead, Perera, Lancaster 2006) on the effectiveness of telephone counselling for smoking cessation provided a key source of information in the following review. Therefore, when exploring changes in smoking status following telephone counselling, the Cochrane Review has been used as the key source of

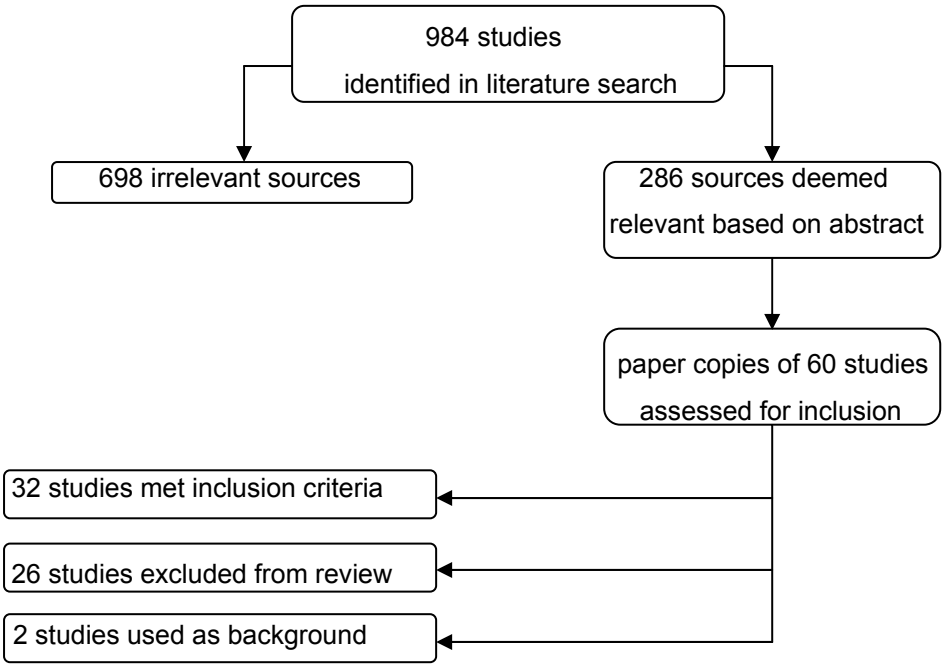
evidence rather than attempting to summarise all of the individual studies identified in the literature search on this topic. However, a number of the studies listed in the Cochrane Review have been separately considered in the following report.

The procedure used to determine whether studies listed in the Cochrane Review should be independently examined was as follows:

1) The abstracts of all the studies listed in the review were searched.
2) Any abstracts that provided mention of the effects of the intervention on any of the subpopulations of interest (such as young people, minority ethnic groups, pregnant women, or low income groups) or any of the other issues of interest (such as unintended consequences, etc) were noted and the copies of the full studies obtained.
3) Following scrutiny of the full papers, two reviewers independently determined whether the studies were relevant enough to rate as evidence.

Following the elimination of 698 irrelevant records based on title alone, the two reviewers assessed abstracts of 286 records for possible inclusion and 60 records were determined to be addressing the key outcomes and populations of interest based on their abstract. Full copies of these studies were obtained and were independently assessed for inclusion by two reviewers. Of these studies, 32 met the inclusion criteria for this rapid review, 2 studies were incorporated as background and 26 studies were excluded from the review (see figure 1). A list of excluded studies with reasons for exclusion is presented in Appendix B.

Figure 1. The evidence



3.3 Quality Appraisal

All of the studies that met the inclusion criteria were rated by two independent reviewers in order to determine the strength of the evidence. Once the research design of each study was determined (using the NICE algorithm), studies were assessed for their methodological rigour and quality based on the critical appraisal checklists provided in Appendix B of the *Public Health Guidance Methods Manual* (see table 1). Each study was categorised by study type and graded using a code

'++', '+' or '–', based on the extent to which the potential sources of bias had been minimised. Those studies that received discrepant ratings from the two reviewers were resolved by discussion (N=6).

There is currently no methodological checklist for cross-sectional studies in the *Public Health Guidance Methods Manual.* In order to assess the quality of these studies, modifications to existing NICE checklists are recommended and a cross-sectional checklist based on the cohort study checklist in the manual was created (see Appendix C).

Table 1. Level and quality of evidence

Type and quality of evidence	
1^{++}	High quality meta-analyses, systematic reviews of RCTs, or RCTs (including cluster RCTs) with a very low risk of bias
1^{+}	Well conducted meta-analyses, systematic reviews of RCTs, or RCTs (including cluster RCTs) with a low risk of bias
1^{-}	Meta-analyses, systematic reviews of RCTs, or RCTs (including cluster RCTs) with a high risk of bias
2^{++}	High quality systematic reviews of these types of studies, or individual, non-RCTs, case-control studies, cohort studies, CBA studies, ITS, and correlation studies with a very low risk of confounding, bias or chance and a high probability that the relationship is causal
2^{+}	Well conducted non-RCTs, case-control studies, cohort studies, CBA studies, ITS and correlation studies with a low risk of confounding, bias or chance and a moderate probability that the relationship is causal
2^{-}	Non-RCTs, case-control studies, cohort studies, CBA studies, ITS and correlation studies with a high risk – or chance – of confounding bias, and a significant risk that the relationship is not causal
3	Non-analytic studies (for example, case reports, case series)
4	Expert opinion, formal consensus
Grading the evidence	
++	**All or most of the quality criteria have been fulfilled** Where they have been fulfilled the conclusions of the study or review are thought *very unlikely* to alter
+	**Some of the criteria have been fulfilled** Where they have been fulfilled the conclusions of the study or review are thought *unlikely* to alter
-	**Few or no criteria fulfilled** **The conclusions of the study are thought *likely or very likely* to alter**

3.4 Synthesis

Due to heterogeneity of design among the studies, a narrative synthesis was conducted.

4. Summary of Findings

This review focuses on the role of quitlines and telephone counselling in promoting smoking cessation amongst different segments of the population. Five research questions were covered in this review:

1. What is the most effective configuration of a smoking cessation quitline? What is the comparative effectiveness of:
   - a reactive telephone quitline?
   - one offering counselling as well as information?
   - a pro-active quitline?
   - proactive vs. reactive quitline?
   - multiple follow-up calls?
   - different deliverers?

2. What type of smokers call telephone quitlines? Is there any evidence that quitlines reach smokers who find other services unappealing or inconvenient? What are the views of those receiving and delivering the intervention?

3. Is there evidence of effectiveness with manual workers (blue collar), pregnant smokers or hard to reach groups, especially ethnic communities? Does effectiveness vary for different population groups? Are some interventions more effective than others for different population groups?

4. Are there any unintended outcomes of the intervention?

5. What is the cost effectiveness of telephone quitlines?

4.1 What is the most effective configuration of a smoking cessation quitline? What is the comparative effectiveness of:

A reactive telephone quitline?

Because of the ethical issues involved in refusing treatment to people who call a quitline seeking smoking cessation support, there are very few controlled studies of reactive quitlines and it is therefore difficult to systematically estimate their impact on cessation (Lichtenstein et al. 1996; Stead, Perera, Lancaster 2006). However, the literature search produced two controlled studies on this topic. In one study on reactive quitlines (Ossip-Klein et al. 1991) (rating 1++), 10 rural counties were randomised to either self-help materials only or the materials plus the hotline condition (where they were offered access to a telephone hotline provided 24-hour access to messages of support and daily access to counsellors). The researchers found that abstinence was consistently higher in the manual plus hotline counties across all follow-ups and definitions of abstinence. Specifically, 1-, 3- and 6- month 48-hour confirmed abstinence prevalence was significantly higher in the materials plus hotline condition (p at least < 0.05) whether measured through cotinine validation or validation by a significant other. Abstinence rates were significantly higher in hotline counties for 180+ day abstinence at 18 months (18 months = 12.6% vs. 9.1%, $P < 0.05$).

In a second study (Zhu et al. 2002) (rating 1+) exploring the real-world effectiveness of a telephone quitline, the researchers randomised smokers calling the quitline to control groups (mailed self-help materials) and treatment groups (up to 6 sessions emphasising relapse prevention) in such a way that smokers in the control group who called for follow-up counselling were given treatment, but could be excluded from the final analysis. Analyses factoring out both the subgroup of control subjects who received counselling indicate that counselling approximately doubled abstinence rates ($P < 0.001$).

Aside from these controlled studies, several follow-up studies of smokers calling quitlines exist, which provide further information about long-term quit rates achieved by quitlines. Owen (2000) (rating 2+) reports the results of a study in which changes in smoking status were assessed at one-year follow-up in a random sample of callers to the UK Quitline. At one year, 22% (95% CI 18.4% to 25.6%) of smokers contacted reported that they had stopped smoking, although when those callers who did not take part in the follow up were defined as continuing smokers the adjusted quit rate was 15.6% (95% CI 12.7% to 18.9%). In a similar study exploring the effectiveness of the Maine Tobacco Helpline services in the USA (Swartz et al. 2005) (rating 2+), intent-to-treat quit rates at 6 months were 12.3% (95% CI 8.1% to 17.6%). Finally, a third study exploring the effectiveness of the Scottish quitline (Platt et al. 1997) (rating 2+) estimates that 8.2% (SD: 2.2%) of smokers stopped smoking with direct help from Smokeline.

No. 1

Strength and applicability of evidence

Two 1+ studies found that reactive quitlines improved abstinence rates over the distribution of self-help materials alone. Three 2+ studies provide further support for the effectiveness of quitlines, and found self-report 12-month abstinence rates of between 8.2% to 15.6%.

As two of these studies took place in the UK, and results are broadly consistent across studies, these findings are likely to be directly applicable to a UK setting.

One offering counselling as well as information?
The literature search failed to produce any studies that systematically explore the additive effect of offering counselling as well as verbal information to callers accessing quitlines – although a number of studies explored the comparative effectiveness of offering counselling as well as written materials (see below).

No. 2

Strength and applicability of evidence

The literature search failed to produce any studies that systematically explore the additive effect of offering counselling as well as verbal information to callers accessing quitlines.

A pro-active quitline?
The Cochrane review covers eight studies that compared the addition of proactive telephone counselling to the provision of materials or brief counselling at a single call to a quitline. These studies showed consistent evidence of a benefit from the additional support (OR 1.41, 95% CI 1.27 to 1.57), despite moderate heterogeneity (I^2 = 58%). These findings are confirmed in a recent meta-analysis of proactive telephone counselling as an adjunct to a minimal intervention (e.g. the provision of self-help materials) (Pan 2006) (rating 1+), which found that proactive telephone counselling increased the odds of quitting by 64% (OR1.6, 95% CI).

The Cochrane review (Stead, Perera, Lancaster 2006) (rating 1++) also covered 19 trials on proactive telephone counselling not initiated by calls to a quitline. There was moderate heterogeneity between the results of the 29 trials (I^2 = 64%) and the pooled effect suggested a modest benefit of counselling (OR 1.33, 95% CI 1.21 to 1.47). In a further seven trials where counselling was used as an adjunct to the systematic use or offer of nicotine replacement therapy (NRT), there was a marginally significant effect with low heterogeneity (I^2 =12%, OR 1.28, 95% CI 1.06 to 1.54).

These results are also confirmed in an earlier meta-analysis of 10 studies on telephone counselling for smoking cessation (Lichtenstein et al. 1996) (rating 1+) which found the common odds ratio comparing cessation rates in the phone counselling versus control conditions was 1.34 (95% CI 1.19-1.51). The researchers therefore conclude that the proactive phone counselling produces a modest significant effect.

No. 3

Strength and applicability of evidence

There is strong evidence from a 1++ Cochrane Review and one 1+ meta-analysis that proactive telephone counselling has a modest effect on smoking cessation.

As these reviews are international in scope their findings are likely to be applicable to a UK setting.

Proactive vs. reactive quitline?
It is difficult to evaluate the comparative effectiveness of proactive and reactive interventions. As previously noted, while proactive interventions have been rigorously evaluated, few controlled studies of reactive interventions exist. However,

the literature search produced one study (Helgason et al. 2004) (rating 2+) which compares the effectiveness of reactive and proactive support in the context of the Swedish national quitline. In this study, two cohorts of smokers were followed up at 12 months: the reactive cohort consisted of smokers who had called the quitline without any contact initiated by counsellors, and the proactive cohort consisted of smokers who received 4-5 contacts initiated by the counsellor after their first call to the service. The researchers found that 12-month overall self-reported abstinence rate was somewhat higher in the proactive group than the reactive group (33% vs. 28%), but the difference was not statistically significant (p=0.08).

No. 4

Strength and applicability of evidence

Although there is limited available evidence regarding the comparative effectiveness of proactive and reactive quitlines, one 2+ study found that self-reported 12-month abstinence rates were somewhat higher for proactive compared with reactive support – although the difference was not statistically significant.

Although the study was conducted in Northern Europe, its results are likely to be broadly applicable to a UK setting.

Multiple follow-up calls?

In the Cochrane review (Stead, Perera, Lancaster 2006) (rating 1++), a subgroup analysis was conducted on the additive impact of increasing the number of counselling calls. Three classificatory categories were used: 1) two or fewer sessions; 2) 3-6 sessions or 3) 7 or more sessions. Results were pooled for all 29 studies of proactive telephone counselling. There were 7 trials in the lowest intensity category all providing one or two calls. There was limited heterogeneity (I^2 = 32%) and no significant effect was detected (OR 1.00, 95% CI 0.80 to 1.24). 19 trials offered between 3-6 phone counselling sessions and there was low to moderate heterogeneity (I^2 = 42%) and a significant effect showing a modest benefit of increased counselling (OR 1.38, 95% CI 1.23 to 1.55). Three trials included 7 or more counselling sessions. Pooling showed a significant benefit, suggesting effectiveness of this intensity of intervention but uncertainty about the likely size.

No. 5

Strength and applicability of evidence

A Cochrane Review (rating 1++) provides strong evidence that multiple follow-up calls (3-6 calls) have a modest effect on smoking cessation (OR 1.38, 95% CI 1.23 to 1.55).

As the Cochrane review is international in scope and these findings are likely to be directly applicable to a UK setting.

Different deliverers?
The literature search failed to produce any studies that systematically explore the impact of different deliverers on the intervention effectiveness. In a non-systematic review of the evidence base regarding quitlines (Ossip-Klein, McIntosh 2003), the reviewers argue that "there is no evidence for the greater effectiveness of one counsellor type compared with others" (p. 202), but it is unclear whether this is because all counsellor types are equally effective or merely because no research has been conducted into this specific issue.

No. 6

Strength and applicability of evidence

There is no evidence regarding the greater effectiveness of one counsellor type compared with others. However, it is unclear whether this is because all counsellor types are equally effective or merely because no research has been conducted into this specific issue.

4.2.1 What type of smokers call telephone quitlines?

One UK study (Gilbert, Sutton, Sutherland 2005) (rating 2+) explores the characteristics of smokers seeking advice through QUIT compared to individuals seeking assistance from a stop-smoking clinic, and smokers in the general population. The researchers found that the majority of Quitline calls (62.1%) were from women, despite the fact that only 48.3% of smokers in the general population are female. Women were also more likely to call the Quitline after beginning their attempt than men (49% vs. 39%). Interestingly, the age profile of helpline callers reflected that of the general population more than the age profile of clinic attenders (clinic attenders had a mean age of 45.8). Smokers aged 25-34 years represented 30.6% of callers to the Quitline while they represented only 20.9% of those attending the stop-smoking clinic. Even more strikingly, smokers under 25 years represented 13% of callers to the Quitline, while they represented only 1.6% of smokers attending the stop-smoking clinic. Finally, Quitline callers were more dependent (36.8%) than smokers in the general population, but less dependent than smokers attending the stop-smoking clinic (42%).

Another UK study (Owen 2000) (rating 2+) evaluated the impact of the same Quitline during the context of a mass media campaign. Compared to the population of adult smokers in England, callers were more likely to be women (60%), to be in the age groups 25-34 (31%) or 35-44 (20%), to come from households with children under the age of 16 (44%) and to be heavy smokers (58% smoked 20 or more cigarettes a day). Furthermore, the social class profile of callers at one year reflected the social class profile of all adult smokers: 63% were manual workers or unemployed compared with 61% of general population.

A third UK study (Platt et al. 1997) (rating 2+) examines the effectiveness of the Scottish quitline. Once again, the researchers found that women were overrepresented in quitline calls, as 60% of adult callers were women (compared with 52% of the general population of Scotland). Callers were also younger (16-44 years) than the Scottish adult population as a whole (72% vs. 54%), were more likely to be unemployed (16% vs. 10%) and less likely to be home owners (41 vs. 52%). In terms of dependence, over two thirds of callers had tried to quit in the past, while 58% were desperate to stop at the time of their call, and one third claimed that they would do so immediately. Additionally, 56% of smokers smoked 20 or more cigarettes per day compared to 42% of the general Scottish population.

An American study (Swartz et al. 2005)(rating 2+) examining the use of the Maine Tobacco Helpline, comparing smokers state-wide to helpline callers found that callers were more likely to be aged 45-64 (40.2%), female (58.4%) or uninsured (26.2%) than smokers in the general population. Young adults aged 18-24 years and smokers over the age of 65 were less likely to seek telephone treatment; adolescents under the age of 18 were also less likely to call (0.9% of calls).

An American case report on callers to a quitline in Massachusetts (Prout et al. 2002) (rating 3+) similarly compares callers who completed assessments to smokers in the general population in Massachusetts. The researchers found that most of the callers were younger (56% of callers were aged 20-39) and female (62%). A large majority of callers (98.1%) were daily smokers who smoked a median of 23 cigarettes per day. Additionally, 40% of callers had their first cigarette immediately upon awakening and an additional 33% smoked within the first 30 minutes. However, a large number of callers were highly motivated to quit; 93% of callers planned on quitting in the next 30 days.

A case report on the California smokers' helpline (Zhu et al. 2000) (rating 3+) also discusses the demographic characteristics of callers. The researchers found that compared with the general smoking population, callers were more likely to be female and slightly younger. African American callers were overrepresented and Hispanic callers were underrepresented – although the researchers argue that this is accounted for by lower media promotion in the Spanish language during the study period. Overall, minority callers were underrepresented (by 5%), but the researchers argue that with a greater concentration of ethnically and linguistically targeted advertising, the percentage of ethnic minority smokers calling the helpline could be raised.

No. 7

Strength and applicability of evidence

Four 2+ studies and two 3+ case reports provide strong evidence that women are overrepresented in calls to quitlines. There is also reasonably consistent evidence that quitlines attract younger smokers as well as smokers who are more heavily addicted. Two of the 2+ studies also provide some evidence that quitline callers are more likely to occupy a lower social class position and one of the 3+ studies indicates that certain minority ethnic groups are overrepresented in calls to a quitline, although overall minority callers are slightly underrepresented.

As three of the studies were conducted in the UK and results are broadly consistent across all studies, these findings are directly applicable to a UK setting.

4.2.2 Is there any evidence that quitlines reach smokers who find other services unappealing or inappropriate?

There were no studies that specifically examined whether quitline smokers found other services unappealing or inappropriate. However, Gilbert and co-workers (2005) (rating 2+) suggest that the high proportion of young people using quitlines may be due to the fact that young people are eager to seek help to quit but are unwilling or unable to attend a clinic to receive intensive, face-to-face therapy. The researchers also suggest that young people may be more comfortable using free phone numbers and confidential phone lines at an age where cell phone use is high.

No. 8

Strength and applicability of evidence

No studies were identified in the literature search that directly addressed whether quitline callers found other services unappealing or inappropriate. However, a 2+ study suggests that younger individuals may be unwilling or unable to attend a clinic for cessation assistance and may prefer calling confidential quitlines.

As this is a UK study, its findings are directly applicable to a UK setting.

4.2.3 What are the views of those receiving and delivering the intervention?

No studies were identified in the literature search that addressed the views of those receiving and delivering the intervention.

No. 9

Strength and applicability of evidence

No studies were identified in the literature search that addressed the views of those receiving and delivering the intervention.

4.3.1 Is there evidence of effectiveness with manual workers (blue collar), pregnant smokers or hard to reach groups, especially ethnic communities?

Teenagers and young adults

Lipkus and co-workers (2004) (rating 1+) conducted a study in which teenage smokers (15-18 years old) were randomised to receive either self-help materials with a video, or self-help materials with a video and telephone counselling. Three counselling calls were attempted with each teen and calls were timed to occur 2-3 weeks apart. Based on intent-to-treat analyses, cessation rates based on 7-day point prevalence abstinence for the self-help and counselling arms were 11% and 16%, respectively ($P = 0.25$), at 4 months post-baseline, and 19% and 21%, respectively ($p = 0.80$), at 8 months post-baseline. Thus, the cessation rates did not significantly differ between treatment arms. Based on intent-to-treat analyses, participants who completed more counselling calls were more likely to report having quit at 4 and 8 months post-baseline (OR 1.59, 95% CI 1.14 to 2.22 for 4 months; OR 1.54, 95% CI 1.15 to 2.07 for 8 months, ps < 0.007) and to have sustained abstinence (OR 2.03, 95% CI 1.14-2.22, $p < 0.006$). However, based on the observed data, number of completed counselling calls was unrelated to cessation at

4 months (OR 1.26, 95% CI 0.89-1.80, p < 0.20) or 8 months post-baseline (OR 1.24, 95% CI 0.91-1.70, p < 0.18) or to sustained abstinence (OR 1.5, 95% CI 0.91-2.48, p < 0.10). The researchers argue that the intervention dose may not have been strong enough to promote cessation and they point out that the direction of change was consistent with the intent-to-treat analyses.

Rabius and co-workers (2004) (rating 1-) discuss the results of a study in which smokers were randomised to either self-help materials alone or self-help materials with telephone counselling. Up to five counselling sessions were available and the counsellors used motivational interviewing (MI) techniques to increase motivation and coping skills for smoking cessation. Using intent to treat analysis, 3 month self-reported quit rates among both younger (18-25 years) and older smokers (over 25) were significantly higher among those who received telephone counselling than among those who received self help booklets only. However, among the younger age group, treatment condition was the only significant (p < 0.01) predictor of abstinence during the 48 hours preceding the 3-month follow-up interview.

No. 10

Strength and applicability of evidence

Overall, the evidence regarding the impact of telephone counselling on young smokers is inconclusive. A 1+ study failed to find evidence of a significant telephone counselling effect on teenage smokers at 4- and 8-month follow up, although the direction of change was positive. However, a 1- study found that telephone counselling was the key predictor of abstinence in younger smokers (age 18-25) at 3-month follow up.

Although the studies are American, their findings are likely to be broadly applicable to a UK setting.

Low-income groups

One study (Osinubi et al. 2003) (rating 1+) explores the impact of a telephone-based smoking cessation intervention on blue-collar asbestos workers. The intervention group received brief physician advice to quit smoking and were proactively enrolled in a telephone-based smoking cessation counselling programme. The cessation specialist counselled the subjects on the behavioural aspects of smoking cessation, worked with the subjects in setting quit dates, and made recommendations for adjunct pharmacotherapies. The control group received brief physician advice to quit smoking as well as written instructions to follow up with their personal physicians for assistance to quit. They also received self-help materials for smoking cessation and a local listing of smoking cessation resource centres. Intent-to-treat analysis revealed a 16.7% self-report quit rate at 6 months for the intervention group compared to 6.9% for the control group (P= 0.25). Quit rates based on treatment received were 33.3% for the intervention group and 6.9% for the control group (P = 0.05). There were no significant differences in demographics, smoking characteristics and motivation to quit and barriers to cessation at baseline between the subjects.

A second study (Vidrine et al. 2006) (rating 1++) also affirms the effectiveness of telephone counselling for a low income population; in this case, the researchers explored smoking cessation amongst economically disadvantaged HIV-positive individuals assigned to either recommended standard of care (RSOC) or a cell phone intervention. In the RSOC condition, physicians advised all participants to quit

smoking and assisted them in setting a quit date within the next 7 days, and offered them a 10-week supply of nicotine replacement therapy. The participants in the cell phone condition received a prepaid cell phone, a proactive counselling call schedule consisting of 8 phone calls over a two-month period and a phone number to access a hotline. The proactive cell phone-delivered counselling sessions were based on cognitive-behavioural techniques and focused on increasing social support while teaching coping strategies and problem solving skills. At 3-month follow-up the researchers found that participants randomised to the cell phone intervention were significantly more likely to be abstinent (biochemically confirmed, point prevalence) than participants in the RSOC groups (complete-case OR, 5.6; 95% CI, 1.4-33.4; intent-to-treat OR, 3.8; 95% CI, 1.1-13.4).

A third study (Wadland, Soffelmayr, Ives 2001) (rating 1+) conducted with low income smokers also found individualised telephone counselling to be effective. In this study the researchers evaluated the comparative effectiveness of usual care (physician-delivered advice and follow-up) and usual care enhanced by 6 computer-assisted telephone counselling sessions delivered by office nurses and telephone counsellors. Telephone counselling consisted of 6 sessions: the first the day after the quit date; session 2: 3 days later; session 3: a week later; session 4: 2 weeks later; session 5: a month later and session 6: 2 months later. Sessions lasted approximately 15 to 20 minutes. 60% of the participants in the telephone-counselling sessions received at least 4 treatment sessions. At 3-month follow-up, CO-validated quit rates were 8.1% in the usual care group and 21% in the telephone-counselling group (P = .009) by intention-to-treat analysis.

A retrospective cohort study (El-Bastawissi et al. 2003) (rating 2+) explores the effectiveness of a telephone intervention for low income smokers registered with a telephone-based cessation programme. Participants in the programme received up to five scheduled telephone calls from a counsellor during a one year period from the date of registration; calls covered the development of a quit plan and the provision of motivational- and behaviour-change counselling. The researchers found that smokers who completed 5 calls were 60% more likely to self-report as abstinent (OR 1.6, 95% CI 0.09 to 3.1) at 12-month follow up, but the difference was not significant due to the small numbers contacted.

Solomon and co-workers (2000b) (rating 1+) explore the impact of telephone counselling on low-income Medicaid-eligible female smokers. All women received free nicotine patches through the mail with instructions to stop smoking the day after their patches arrived. Women randomised to the intervention condition received the free nicotine patches through the mail plus proactive telephone support provided by peer counsellors (ex-smokers) consisting of 4 months of proactive telephone support from trained female ex-smokers. The support person provided encouragement, guidance and reinforcement for quitting smoking. At 3 months a significant association between abstinence (confirmed biochemically) and condition was observed (P= 0.03) with 42% of experimental women and 28% of comparison group women reporting no smoking in the past 7 days. By 6-month follow up, all significant differences in reported abstinence had disappeared (23% vs. 19% in the experimental and control conditions, respectively).

These results were duplicated in a later methodologically similar study by the same research team (Solomon et al. 2005) (rating 1+) also exploring the impact of telephone counselling on low-income women smokers between 18-50 currently receiving Medicaid. At 3 months, there was a significant effect for the proactive telephone peer support – whether 7 day or 30 day point prevalence abstinence was the dependent variable. Thirty-day point prevalent abstinence rates were 42.7%

versus 26.4% in the experimental and control conditions, respectively (P = 0.002), producing an odds ratio of 2.07 (95% CI 1.30, 3.30), suggesting that adding the proactive telephone support to the provision of nicotine patches doubled the odds of being abstinent at three months. However, by six-month follow-up the treatment effect was no longer evident, and neither 7-day or 30-day point prevalent abstinence rates were significantly different: 32.8% of experimental participants and 25.8% of controls reported not smoking in the past 30 days (P = 0.17). Nevertheless, when the relationship between 6-month smoking status and receipt of complete vs. incomplete sequences of 4-month support calls was examined, chi-square results revealed a significant association (P< 0.001), with 54% abstinence amongst experimental participants who received support calls vs. 15% among those who terminated calls or could not be reached. Thus, a dose-response relationship between number of phone calls and cessation in the experimental condition was evident.

No. 11

Strength and applicability of evidence

Four 1+ studies found telephone counselling to be effective for particular subpopulations of low income smokers at 3-month follow up. However, two of these studies followed up participants beyond 3 months and failed to find evidence of a treatment effect at 6-months – although a fifth 1++ study did find evidence of a treatment effect at 6 months. A sixth 2+ study failed to find evidence of a significant treatment effect at 12 months, although the direction of change was positive. Overall, the evidence suggests that telephone counselling is effective in facilitating short-term cessation in low-income smokers, but that the treatment effect may lessen over time.

As some of the studies deal with very specific low-income populations and none of the studies is British, it is unclear how applicable these findings are to a UK setting.

Pregnant women

A number of studies have evaluated the effectiveness of telephone counselling with pregnant women. Rigotti and co-workers (2006) (rating 1++) report the results of a study in which pregnant smokers were randomised to either brief advice from their health provider and a mailed self-help manual or telephone calls on top of these components. Intervention subjects each had a dedicated counsellor who offered up to 90 minutes of counselling during pregnancy and up to 15 minutes of counselling over 2 months post partum (on average 5 contacts occurred). Cotinine-validated 7-day point-prevalence abstinence rates in the intervention and control groups were 10% vs. 7.5% (OR 1.37, 95% CI 0.69 to 2.70, P = 0.39) at the end of pregnancy and 6.7% vs. 7.1% (OR 0.93, 95% CI 0.44 to 1.99, P = 1.00) at 3 months postpartum. Within the intervention group, women who received 5 or more counselling calls had higher end-of-pregnancy validated cessation rates than women who received fewer calls (19% vs. 7%, P = 0.01). However, intervention and control groups did not differ significantly in cotinine-validated sustained abstinence at either the end of pregnancy and postpartum assessments. Interestingly, the intervention did increase cotinine-verified abstinence at the end of pregnancy among the 201 women who were light smokers (< 10 cigarettes/day at student enrolment (intervention, 19.1% vs control, 8.4%, OR 2.58, 95% CI 1.10 to 6.1, P = 0.036) but not among the 220 heavier smokers.

Stotts and co-workers (2002) (rating 1+) conducted a late pregnancy, smoking cessation intervention with 'resistant' smokers. Women who continued to smoke following 28 weeks of pregnancy were randomised to either usual care or a one-to-one smoking cessation intervention consisting of three components: one 2-30 minute telephone counselling call using motivational interviewing strategies and techniques conducted in 2 weeks following 28th week interview; a personalised, stages of change-based feedback letter mailed within a week of the first counselling calls; and a final motivational MI-based, telephone counselling call conducted 4-5 days after the feedback letter was sent. No differences were found between experimental and control group women on post-treatment, 34th week smoking status measured via urinary cotinine ($x^2(1, n=175)=0.230$, $p \leq .64$). Thirty-four percent of women in the control group were classified as abstinent compared to 32% in the experimental group. However, as the experimental group contained more women who were heavier smokers than the control group and also had a higher proportion of smoking partners, this may have impacted the study's findings.

McBride and co-workers (1999) (rating 1+) conducted an intervention designed to prevent relapse in women who quit smoking during pregnancy. Women were randomised to 1 of 3 intervention groups: self-help booklet only, booklet plus prepartum intervention or booklet plus prepartum and postpartum intervention. The intervention was delivered via mail and telephone counselling. Prepartum telephone counselling consisted of 3 counselling calls, the first call occurred approximately 2 weeks after the booklet was mailed and calls 2 and 3 followed at 1 month intervals. The format for calls was open-ended although counsellors used a standardised protocol based on motivational interviewing techniques. Women in the postpartum group were also mailed 3 newsletters that included information about the impact of environmental tobacco smoke and the importance of being a non-smoking parent. Prepartum 7-day abstinence did not differ between the booklet-only group and the combined prepartum and pre-postpartum groups (47% vs 50%; $P < 0.17$). 7-day prevalent abstinence at the 28 week follow-up did not differ by intervention group (prepartum and pre/post, 21%, vs booklet-only, 19%; $P = 0.90$). Amongst those who reported 7-day abstinence at the 28 week follow-up, at 8 weeks postpartum the proportion who had relapsed was lower, although not significantly ($P=0.09$) in the pre/post (33%) and prepartum (35%) groups than in the booklet-only group (44%). At 6 months postpartum, the proportion who had relapsed remained lower ($P=0.09$) in the pre/post group (42%) than in the prepartum (53%) and booklet-only (55%) groups. By the 12 month follow up there was little difference in relapse rates across the intervention groups. Thus interventions may delay but not prevent a postpartum return to smoking.

Solomon and co-workers (2000a) (rating 1+) report the results of a study which tested the impact of physician/midwife advice with and without proactive telephone peer support provided by a woman ex-smoker between routine prenatal visits. Participants were randomised to either the experimental or comparison condition. Women in the comparison condition (N=74) received brief smoking cessation advice delivered by an obstetrician/midwife at the first three prenatal visits along with stage appropriate printed materials. Women in the experimental condition (N=77) received the same advice and materials plus the offer of telephone peer support. Ongoing calls were typically provided on a weekly basis, but more frequently around a quit date and less frequently as smoking changes stabilised. Study results revealed a non-significant association between condition and abstinence at the end of pregnancy, although quit rates were in the predicted direction (confirmed abstinence rate was 18.2% in experimental condition and 14.9% in comparison condition). However, as the number of women enrolled in the study was half that required based on initial power calculations, these findings were inconclusive.

Ershoff and co-workers (1999) (rating 1+) report the results of a study wherein pregnant smokers were randomised to either 1) a low-cost, self-help booklet; 2) the booklet plus a computerised, interactive voice response telephone programme and 3) the booklet plus MI-based counselling delivered in telephone calls by nurse educators. They found no statistically significant intervention differences between the groups. The key predictor of smoking cessation was the number of cigarettes smoked per day, with women who reported smoking five or more cigarettes per day, the observed probability of achieving a biochemically confirmed quit was only 6.1% in contrast with 32.9% of those smoking four or fewer cigarettes per day.

No. 12

Strength and applicability of evidence

One 1++ study and four 1+ studies uniformly conclude that telephone counselling does not have proven efficacy for pregnant smokers over and above self-help materials or brief advice from a physician. However, several studies demonstrate the direction of change in abstinence rates is positive, and there is some evidence that telephone counselling appears to have a greater impact on light smokers than heavy smokers.

Although the studies were conducted in the USA, their results are likely to be broadly applicable to a UK setting.

Minority Ethnic Groups

The literature search produced very few studies that systematically explored the effectiveness of telephone counselling for minority ethnic groups. Lipkus and co-workers (1999) (rating 1-) explore the impact of tailored interventions to enhance smoking cessation among African-Americans. Study participants were randomised to three intervention types: 1) health care provider prompting intervention alone, 2) health care provider prompting intervention with tailored print self-help communications, and 3) health care provider prompting intervention with tailored print self-help communications and tailored telephone counselling. In the telephone counselling condition, men received one call per year and women could receive two calls. The counsellor identified the smoker's current smoking status and attempted to motivate stage-based movement towards quitting as well as help to overcome individual barriers to quitting. Those who received the provider prompting intervention and tailored materials were more likely to have quit at follow-up (32.7%) than those who were in the provider prompting intervention group alone (13.2%), or those who received all three levels of the intervention (19.2%, X^2 (2, N=10) = 6.3, $p < 0.05$). However, the low number of counselling calls provided may have not been enough to show an effect.

A second US study (Wetter et al. 2007) (rating 1+) examines the impact of standard counselling (SC) or enhanced counselling (EC) on Spanish-speaking smokers calling the National Cancer Institute's Cancer Information Service (CIS). SC consisted of a single CIS counselling session, plus an offer of Spanish language self-help materials to be mailed to the participant if preferred. EC consisted of SC plus 3 additional proactive counselling calls 1, 2 and 4 weeks after the initial call. At 3-month follow-up, the unadjusted effect of EC (based on self-reported abstinence rates) only approached significance (OR = 2.4, P = 0.77), but became significant after controlling for demographic and tobacco-related variables (OR = 3.8, P = 0.48). The researchers therefore conclude that telephone counselling is an effective intervention for a traditionally 'hard to reach' group such as Hispanic smokers.

No. 13

Strength and applicability of evidence

Further research needs to be conducted into the effectiveness of telephone counselling for minority ethnic groups as the existing limited evidence is inconclusive. A 1- study found that the addition of telephone counselling did not improve the effectiveness of a smoking cessation intervention aimed at African American smokers above and beyond a provider-prompted intervention and self-help materials. A second 1+ study found that enhanced telephone counselling for Hispanic smokers did significantly increase abstinence rates, when demographic and smoking-related variables were controlled.

As these studies were conducted in the USA, which has a different ethnic composition to the UK, their results are not directly applicable to a UK setting.

4.3.2 Does effectiveness vary for different population groups?

In his meta-analysis of 22 studies examining the effectiveness of proactive telephone counselling as an adjunct to minimal interventions for smoking cessation (e.g. physician advice or self-help materials), Pan (2006) found that older (B = -0.02, t = -5.00, $P < 0.001$), female (B = -0.69, t = -3.45, $P < 0.001$) and heavier smokers (B = -0.05, t = -7.29, $P < 0.001$) were less likely to quit smoking than other participants in the studies. As a result of these findings, Pan concludes: "…health care providers may need to focus on participants as much as on intervention process to obtain more effective interventions" (p. 424).

No. 14

Strength and applicability of evidence

There is evidence from a 1+ meta-analysis that older, female and heavier smokers are less likely to quit smoking as a result of proactive telephone counselling than other population groups.

As the review is international in scope, its findings are broadly applicable to a UK setting.

4.3.3 Are some interventions more effective than others for different population groups?

The literature search produced two studies that explore whether one telephone intervention type is more effective than another for different population groups. In a study of whether content increases the efficacy of telephone counselling for smoking cessation, Mermelstein and co-workers (2003) (rating 1+) found important demographic differences in outcome. The researchers randomised participants to basic content, consisting primarily of non-specific verbal support or 'enhanced' content, which consisted of support tailored to the stage of cessation and targeting factors hypothesised to be related to success (such as motivation, self-efficacy and negative affect). Contrary to their hypothesis that participants in the enhanced condition would have better outcomes than those in the basic condition, at 15-month follow-up, the researchers found a significant interaction between treatment condition and gender (X^2 4.26, $p < 0.05$). For men the enhanced condition produced consistently higher biochemically-validated abstinence rates than did the basic condition; however, for women there was not a significant difference between the

conditions, although the abstinence rates were slightly higher for the basic condition than the enhanced condition. Moreover, there was also a significant gender x condition interaction for relapse rates (X^2 4.91, $p < 0.03$), as men relapsed less in the enhanced condition and women relapsed less in the basic condition. However, there were no significant ethnicity x condition, level of dependence x condition or education x condition interactions.

A cohort study (Helgason et al. 2004) (rating 2+) of factors related to abstinence in the national Swedish quitline also reports important demographic differences in outcome. The researchers followed up two cohorts of smokers: those who had called the reactive quitline (no contact initiated by counsellors) and those who had called the proactive quitline (four or five contacts initiated by the counsellors after the first call). At 12-month follow-up of two cohorts, the researchers found that proactive treatment significantly enhanced self-reported abstinence rates in women but not in men (34% vs. 27%, respectively, $p = 0.03$, 0.80). The researchers conclude that to increase cost-effectiveness, one option may be to offer the proactive service only to women.

No. 15

Strength and applicability of evidence

Overall, there is evidence from a 1+ study and a 2+ study that some telephone interventions are more effective than others for different population groups such as women and men.

Although these studies were conducted outside of the UK, their findings are likely to be broadly applicable to a UK setting.

4.4 Are there any unintended outcomes of the intervention?

Two studies suggest that quitlines may have an impact beyond that which can be measured by quit rates amongst callers and highlight positive unintended outcomes of establishing quitlines for smoking cessation. First, according to one case report (Wakefield, Borland 2000) (rating 3+), quitlines serve an important symbolic function – they let smokers know that quitting is so important that there are dedicated services provided to support their efforts to stop smoking. Second, in their study of 10 American quitlines, Ossip-Klein and co-workers (1991) (rating 1+) found evidence of a 'hotline effect' in increasing quit attempts following a slip/relapse. They report that abstinence rates were consistently higher for users compared with non-users, although they were most often significant for shorter abstinence periods – a pattern consistent with a hotline effect on increasing re-quitting following a slip/relapse. However, they speculate that it was unlikely that the higher abstinence rate among users accounted for the total differences in outcome between users and non-users, as "it is possible that simply knowing that telephone help was there if needed enhanced abstinence even among nonusers" (p. 331).

No. 16

Strength and applicability of evidence

Two studies highlight possible positive unintended outcomes of quitline interventions. First, a 3+ study speculates that quitlines symbolically reinforce the importance of smoking cessation to smokers. Second, a 1+ study speculates that the existence of a quitline increases quit attempts amongst users and possibly also amongst non-users – who know that they can turn to the quitline for help if necessary.

Although these studies were conducted outside of the UK, their findings are likely to be broadly applicable to a UK setting.

4.5 What is the cost effectiveness of telephone quitlines?

Although many studies are based on the premise that telephone quitlines are highly cost effective, relatively few researchers have systematically explored the cost effectiveness of telephone quitlines. The key source of available evidence on this topic is a recent study (Tomson, Helgason, Gilljam 2004) (+ rating) which reports the cost effectiveness of the national Swedish quitline over 2 years in relation to the number of quitters during this period and available data about life years saved for those who quit smoking. The total cost of the services (including salaries, rent of office premises, equipment, IT services, printing, advertising, telephone, fax, costs of NRT provided by the quitline over the 22-month study period was USD$0.7 million. The researchers calculate the cost per year of life saved as equivalent to $USD311-401. The cost per quitter ranged between $USD1,052-1,360. The researchers conclude that smoking cessation telephone quitlines are a particularly cost effective health intervention and suggest that they are an essential part of comprehensive, publicly funded, national tobacco control programmes.

Although not a cost effectiveness analysis, another study (Keller et al. 2007) (rating 2+) provides a summary of the costs of organising, financing and promoting quitlines in all 50 US states. The researchers found that the median annual per-capita cost for providing quitline services was $.024 (N=35 states) and $0.9 for promotion activities and conclude that: “Quitlines represent an extraordinarily modest expense for states that provide these services”.

However, although telephone quitlines have the potential to be extremely cost effective, this largely depends on how many users they attract. One case report (Glasgow et al. 1993) (rating 3+) warns that telephone helplines can be quite expensive if they do not reach their target population. The authors report that despite the creation of a telephone help line that was carefully developed and heavily promoted, few callers rang for support (an average of 2.3 calls per week). The researchers argue that based on a conservative estimate of $7,232 for the creation of the hotline, the cost of the intervention was approximately $81 per call. The researchers advise that: “help lines appeal to a very small minority of potential users and need to be marketed to very large populations to be cost-effective” (Glasgow et al. 1993: 253).

No. 17

Strength and applicability of evidence

Although further research is needed regarding the cost-effectiveness of quitlines, a cost effectiveness analysis of the Swedish national quitline (+ rating) found it to be particularly cost effective: the researchers calculate the cost per year of life saved as equivalent to $USD311-401. A 2+ study of the cost of US state quitlines also deems them to represent a very modest expense for the governments that provide these services, although a 3+ case report warns that services need to be marketed to large populations to be cost-effective.

Although these studies were conducted outside of the UK, the costs of running a national quitline are likely to be similar from one country to the next. Therefore, their findings are likely to be broadly applicable to a UK setting.

5. Overview and Discussion

The quality of evidence on the impact of quitlines on smoking cessation is reasonably high, and a number of controlled studies exist exploring the effectiveness of telephone counselling on smoking cessation amongst the general population and specific population subgroups. Two 1+ American studies found that reactive quitlines improved abstinence rates over the distribution of self-help materials alone. Supplementary evidence from three 2+ studies also supports the effectiveness of reactive telephone quitlines, as all studies report 12-month abstinence rates of between 8.2% to 15.6%. There is also a consistent body of evidence from a 1++ Cochrane Review and two 1+ meta-analyses that proactive telephone counselling has a modest effect on smoking cessation – whether this counselling occurs in the context of a quitline or not.

Although it is difficult to evaluate the comparative effectiveness of proactive and reactive interventions, one 2+ study compares the effectiveness of reactive and proactive support in the context of the Swedish national quitline. The researchers found that 12-month overall self-reported abstinence rate was somewhat higher in the proactive group than the reactive group (33% vs. 28%), but the difference was not statistically significant (p=0.08).

Evidence on the effectiveness of multiple follow-up calls is more straightforward, as a 1++ Cochrane Review provides strong evidence that multiple follow-up calls (3-6 calls) have a modest effect on smoking cessation (OR 1.38, 95% CI 1.23 to 1.55). Unfortunately, the literature search failed to produce any studies on whether counselling is more effective than general information or whether different deliverers impact the effectiveness of interventions.

Although there is evidence of the effectiveness of quitlines, not all populations of smokers utilise them equally. There is consistent evidence from three 2+ UK studies, one 2+ US study and two 3+ US case reports that women are overrepresented in calls to quitlines. There is also reasonably consistent evidence that quitlines attract younger smokers as well as smokers who are more heavily addicted and there is some evidence that quitline callers are more likely to occupy a lower social class position. Available evidence also indicates that certain minority ethnic groups are overrepresented in calls to quitlines, although overall minority callers are slightly underrepresented. However, further research is needed on this topic.

Unfortunately, there were no studies that specifically examined whether quitline smokers found other services unappealing or inappropriate. However, the authors of a 2+ study suggest that the high proportion of young people using quitlines may be due to the fact that young people are eager to seek help to quit but are unwilling or unable to attend a clinic to receive intensive, face-to-face therapy and are more comfortable calling quitlines. No studies were identified in the literature search that addressed the views of those receiving and delivering the intervention.

A substantial number of controlled studies have been conducted which explore the effectiveness of telephone counselling for particular subpopulations such as teenagers, low income smokers and pregnant women. Overall, the evidence regarding the impact of telephone counselling on young smokers (aged 15-25) is inconclusive. A 1+ study failed to find evidence of a significant telephone counselling effect on teenage smokers at 4- and 8-month follow up, although the direction of change was positive. However, a 1- study found that telephone counselling was the key predictor of abstinence in younger smokers (age 18-25) at 3-month follow up.

The evidence regarding the impact of telephone counselling on low income smokers is more consistent. Four 1+ studies found telephone counselling to be effective for particular subpopulations of low income smokers at 3-month follow up. However, two of these studies followed up participants beyond 3 months and failed to find evidence of a treatment effect at 6-months – although a fifth 1++ study did find evidence of a treatment effect at 6 months. A sixth study failed to find evidence of a significant treatment effect at 12 months, although the direction of change was positive. Overall, the evidence suggests that telephone counselling is effective in facilitating short-term cessation in low-income smokers, but that the treatment effect may lessen over time.

A number of studies have also evaluated the effectiveness of telephone counselling with pregnant women. One 1++ study and four 1+ studies uniformly conclude that telephone counselling does not have proven efficacy for pregnant smokers over and above self-help materials or brief advice from a physician. However, several studies demonstrate the direction of change in abstinence rates is positive, and there is some evidence that telephone counselling appears to have a greater impact on light smokers than heavy smokers.

Further research needs to be conducted into the effectiveness of telephone counselling for minority ethnic groups as the existing limited evidence is inconclusive. A 1- study found that the addition of telephone counselling did not improve the effectiveness of a smoking cessation intervention aimed at African American smokers above and beyond a provider-prompted intervention and self-help materials. A second 1+ study found that enhanced telephone counselling for Hispanic smokers did significantly increase abstinence rates, when demographic and smoking-related variables were controlled.

There is also evidence that the effectiveness of telephone counselling varies for different population groups as a 1+ meta-analysis found that older smokers, women and heavier smokers were less likely to quit smoking than other groups of smokers. Therefore, it is unsurprising that a 1+ study and a 2+ study suggest that some telephone interventions are more effective than others for different population groups such as women and men.

The literature search did not produce any studies that describe negative unintended outcomes of quitlines. However, two studies suggest that quitlines may have unintended positive impacts beyond those which can be measured by quit rates amongst callers. First, a 3+ study speculates that quitlines symbolically reinforce the importance of smoking cessation to smokers. Second, a 1+ study speculates that the existence of a quitline increases quit attempts amongst users and possibly also amongst non-users – who know that they can turn to the quitline for help if necessary.

Many studies are based on the premise that telephone quitlines are highly cost effective, relatively few researchers have systematically explored the cost effectiveness of telephone quitlines. Although further research is needed regarding the cost-effectiveness of quitlines, a cost effectiveness analysis of the Swedish national quitline (+ rating) found it to be particularly cost effective: the researchers calculate the cost per year of life saved as equivalent to $USD311-401. A 2+ study of the cost of US state quitlines also deems them to represent a very modest expense for the governments that provide these services, although a 3+ case report warns that services need to be marketed to large populations to be cost-effective.

6. Evidence Table

Evidence table						
First author Year Country Study design Quality	Study population Inclusion/exclusion criteria. Number of participants (randomised to each group or otherwise). Age; Sex; S/E status; Ethnicity; Pregnant; Other, e.g. inpatient, ….	Research question Power calculation Funding	Intervention Comparisons Length of follow-up, follow-up rate	Main results Effect size CI	Applicability to UK populations and settings Relevance to focus of Rapid Review, NHS Stop Smoking Services	Confounders Comments
1. Ershoff 1999 USA RCT 1+	N=390 English-speaking pregnant women 18 years of age or older N= 131 self help booklet only N= 133 booklet plus computerised phone cessation programme. N=126 booklet plus phone counselling from a trained nurse using motivational interviewing techniques and strategies.	Examine whether outcomes achieved with brief counselling from prenatal care providers plus a self help booklet could be improved by adding more resource intensive cognitive behavioural programs. Supported by the Robert Wood Johnson Foundation, Smoke-free Families Initiative.	Participants were randomised into one of three groups: 1) self help booklet tailored to smoking patterns, stage of change and lifestyle of pregnant smokers 2) booklet plus computerised phone cessation program 3) booklet plus phone counselling from a trained nurse using motivational interviewing techniques and strategies. Follow up until 34th week of pregnancy	20% of participants were confirmed as abstinent with no significant differences found between intervention groups (p=.57). No statistically significant intervention differences were detected on any comparison. The average daily consumption of cigarettes dropped only .5 cigarettes from baseline to follow up. 2/3's of smokers reported that they had seriously tried to quit smoking during pregnancy. Less than 1/5 said that they had quit smoking for a week or more. Baseline predictors of cessation included # of cigarettes smoked per day, confidence in ability to quit, exposure to passive smoke and educational level. Cessation rates among heavier smokers was strikingly low in all intervention groups.	Although this is an American study, given the broad similarities between pregnant smokers in the USA and the UK, the findings are likely to be broadly applicable to a UK setting.	A well conducted biochemically validated study. However, there was a lack of information on concealment and randomisation.

2. El-Bastawassi 2003 USA Cohort 2+	N=1334 (423 uninsured, 806 Medicaid and 105 commercially insured) Oregon tobacco users who registered with Free & Clear (F&C) Most participants were white (89%), female (62.2%), 40 years of age or younger (54.4%), and 24% had less than a high school diploma.	To describe the experience of uninsured and Medicaid Oregon tobacco users who registered in Free & Clear (F&C), a telephone-based cessation programme including five scheduled outbound calls and access to adjunctive pharmacotherapy. Funded by the Oregon Health Division, Department of Human Services.	Each F&C participant receives a series of five scheduled telephone calls from an F&C counsellor during a one year period from the date of registration. In calls 2-4, counsellors assist participants in developing a quit plan and provide motivational and behaviour change counselling. During the last call, the counsellor answers questions and reinforces the importance of quitting and staying quit. 12 month follow-up.	The seven day quit rate, assuming non respondents were smokers was 14.8% (95% CI, 13.0-16.9). This rate was significantly higher among commercially insured participants (vs. Medicaid but not uninsured) and among participants who complete ≥5 calls insured participants (vs. ≤ 5 calls). The quit rate for those contacted at 12 months was 30.6% (95% CI 27.0% to 34.3%) and varied, however not significantly by insurance and number of calls. After adjustment, respondents who completed ≥5 calls were 60% more likely to quit tobacco (OR 1.6, 95% CI 0.9 to 3.1), and uninsured respondents who completed ≥5 calls were 70% more likely to quit tobacco (OR 1.7, 95% CI 0.9 to 3.5), relative to those who completed ≤5 calls, but the diff. was not significant. Results are not broken down by sex.	Although this is an American study, smoking in both countries is increasingly concentrated in low income populations who share many similar characteristics. Therefore, the findings of this study are likely to be broadly applicable to a UK setting.	Study was well conducted and outlined bias, and confounders. However, it relies on self-reported abstinence at follow up.

3. Gilbert 2004 UK Cross Sectional 2+	N=1162 callers to the Quitline in May & June 2000 N=1127 smokers attending the South London and Maudsley NHS Smokers clinic. N=14,089 smokers surveyed by the 2000/2001 General Household Survey.	To compare the characteristics of callers to a telephone helpline with those of smokers seeking assistance through a clinic and smokers in a general population sample. Supported by a grant by the Community Fund.	The Quitline offers a reactive telephone counselling service for smokers. It offers brief counselling sessions and/or a printed information pack sent through the post.	Women are overrepresented in calls to the Quitline (62.1% of callers vs. 48.3% of smoking population) but the Quitline attracts substantially more calls from younger smokers than the smoking-cessation clinic (age 25-34 years: 30.6% of callers vs. 20.9% of stop-smoking clinic; age <25 yearrs: 13% of callers vs. 1.6% of stop-smoking clinic). Thus, the age profile of helpline callers corresponds more closely to that of the general population of smokers than does the age profile of clinic attenders. Quitline callers are more dependent (36.8%) than the general population of smokers (15%) but clinic attenders are even more dependent (42%).	As this is a UK study, its results are directly relevant to a UK setting.	Well conducted study. Researchers also outline limitations (data collected from one clinic therefore findings may not be representative of others).
4. Glasgow 1993 USA Case Report 3+	N=2148 adult smokers and their family members participating in a cancer control programme who were the impetus for the creation of the TALK (Tobacco Advice Line at Kaiser) service.	To evaluate the reach of a smoker's hotline. No funding source mentioned.	The TALK service was provided free of charge. Callers could talk with a smoking counsellor, listen to a rotating series of 10-second smoking and health briefs, choose among 10 3-minute audio-tapes on topics such as smoking and weight gain, withdrawal symptoms, etc. After-hours callers could listen to recorded motivational messages or request that a counsellor call back.	The quitline received a total of only 305 calls during 33 months of operation, or an average of 2.3 calls per week. A conservative cost estimate for the helpline, including developing ($1741), equipment and phone lines ($2302), promotion ($3078) and staff training ($111) is $7232. This works out to a cost of approximately $81 per call – and the estimate does not include personnel costs for staffing the helpline.	This is an American report which discusses a quitline set up as part of a specific study. It is therefore unclear how relevant its conclusions are to wide-scale state/national quitlines. However, its message about the importance of marketing seem relevant to a UK setting.	Study was represented as commentary. Although there is no NICE checklist for case reports, the report was qualitatively deemed to be of reasonable quality by 2 reviewers.

5. Helgason 2004 Sweden Cohort study 2+	N=964 smokers calling a reactive quitline and 900 smokers calling a proactive quitline. 71% response rate at 12-month follow up to questionnaire. Characteristics of respondents: 75% F; 25% M; 47% 41-60.	To determine the effectiveness of the Swedish quitline and factors related to abstinence from smoking 12 months after the first contact. The comparative effects of proactive and reactive counselling are also explored. No funding source mentioned.	Reactive cohort: smokers calling the quitline received information and counselling. Proactive cohort: smokers calling the quitline received 4 or 5 contacts initiated by counsellors after the first phone call. The treatment protocol is a mixture of motivational interviewing, cognitive behaviour therapy and pharmacological consultation. Follow up at 12 months	Women receiving proactive treatment reported 34% abstinence rates compared with 27% for those receiving the reactive treatment (p=0.03). For men the abstinence rates were 27% and 28%, respectively (p=0.80). Conclusions: quitlines are effective as an adjunct to the health care system. For women a proactive treatment may be more effective than a reactive treatment.	The results are from a Swedish study. However, the national Swedish quitline is similar to the UK model and results are likely to be broadly comparable to a UK setting.	Overall, a well conducted study. Response rates for the reactive and proactive cohorts were high and comparable (70% and 71%). However, abstinence rate estimates are based on self-report. The study results are also subject to selection bias as non-responders were more likely to be daily smokers.

6. Keller 2007 USA Cross-Sectional 2+	N=38 US states that reported having a quitline.	To ascertain the organisation, financing, promotion and cost of state quitlines. The research was supported by the Partners with Tobacco Use Research Centres program, Robert Wood Johnson Foundation and the Substance Abuse Policy Programme, Robert Wood Johnson Foundation.	The state quitlines offered the following services: 1) mailed information and self-help materials 2) proactive quit-smoking counselling 3) referral to other services 4) speak with a counsellor during set service hours 5) Reactive quit-smoking counselling 6) Recorded messages 7) Web-based information/email/web counselling 8) Speak with counsellor any time 9) provision of quit-smoking medication at low cost	Median state quitline operating budgets in 2004 were $500,000; this translates into a annual median operating cost of $.014 per capita or $0.85 per adult smoker.	The results are from an American study. It is unclear how relevant they are to a UK setting.	Well conducted survey with high participation rates (98%) and good method for dealing with missing survey data (participants recontacted).

7. Lichtenstein 1996 International Meta-analysis 1+	A review of 13 randomised trials on proactive telephone counselling for adult smokers.	Reviews the various ways in which telephone counselling has been used in smoking cessation and provides a meta-analytic review of the evidence. Paper partially supported by grants from the National Cancer Institute and from the National Heart, Lung and Blood Institute.	Reviews 1) reactive helplines offering recorded messages or personal counselling or a combination of both 2) Proactive telephone calls initiated by intervention staff as adjuncts to intensive treatment; adjuncts to personalised written feedback; adjuncts to hospital-initiated interventions and 3) telephone counselling as the primary intervention	The common odds ratio comparing cessation rates in the phone counselling versus control conditions was 1.34 (95% CI 1.19-1.51). Excluding one outlying study increased homogeneity and produced an odds ratio of 2.98 (CI = 2.63-3.32) further confirming the short-term effects of telephone counselling. At long-term follow-up it was necessary to remove two additional studies to obtain a non-significant test of homogeneity. The remaining studies produced a significant common odds ratio of 1.20 (95% CI 1.06-1.37).	This is an international review of the evidence and its findings are therefore likely to be applicable to a UK setting.	Overall, the meta-analysis is well conducted – although only a meta-anlaysis of the efficacy of proactive phone counselling was attempted.

8. Lipkus 1999 USA RCT 1-	N= 160 African American smokers at a community health centre. N=53 provider prompting intervention N=55 provider prompting intervention with tailored print communication N= 52 provider prompting intervention with tailored print communication health care provider prompting intervention with tailored print communication and tailored phone counselling. 48%= male 52%= female	Examine the impact of three tailored intervention approaches to increase quitting rates among African American smokers who were clients of a community health centre that serves primarily low income and indigent persons. Funded by the NCI grant- Enhancing Cancer Control in a Community Health Centre.	Smokers were randomised to one of three groups: 1) health care provider prompting intervention alone 2) health care provider prompting intervention with tailored print communication, and 3) health care provider prompting intervention with tailored print communication and tailored phone counselling. Follow-up occurred 16 months after the intervention	Among 160 smokers who completed the study, 35 (21.8%) had quit smoking at follow up. Smokers who received the provider prompting intervention with tailored print materials were more likely to report having quit than smokers who received the provider intervention alone (32.7% vs. 13.2%, $p<0.05$). Smokers who received all three intervention components were not more likely to report having quit at follow up than those who only received the provider intervention alone (19.2% vs. 13.2%). Smokers who at baseline were less educated, smoked less than half a pack of cigarettes per day, had a stronger desire to quit, felt more efficacious and had thought about quitting were more likely to report having quit at follow up. Education was the only significant demographic predictor of cessation.	As the USA has a very different ethnic composition to the UK, it is unclear how relevant the results of this study are to a UK setting.	Study did not provide enough information on concealment and relied on self report data (there was no biochemical validation). Furthermore, it was unclear whether the intervention groups were comparable at baseline, and no information was provided on drop out rates in relation to each intervention group.

9. Lipkus 2004 USA RCT 1+	N=402 teenagers (age 15-18) Smokers were randomised into 2 groups a) self help materials plus video (N=193) or b) self-help materials, video, and phone counselling (N=209).	To test whether proactive telephone counselling enhances teen smokers' receptivity to and use of self-help cessation approaches and whether it results in higher cessation rates rather than video and self help materials alone. Funded by the National Cancer Institute.	Intervention group received written self-help material, video and telephone counselling. Control group received self help material plus video. Outcomes were measured at 4 months post-baseline, and 8 months post baseline.	Cessation rates based on 7-day point prevalence abstinence for the self-help and counselling arms were 11% and 6% respectively (p=.25), at 4 months post-baseline and 19% and 21%, respectively (p=.80), at 8 months post-baseline. Sustained abstinence reflecting 7-day abstinence at both time points, in the self-help and counselling arms was 7% and 9% (p=.59). Results suggest that minimal self-help cessation approaches that target youth have comparable success to that shown among adult smokers. Results are not broken down by sex or ethnicity.	Although this is an American study, teenagers in both populations are likely to be broadly culturally similar in relation to smoking and cessation activities. Therefore, the results seem broadly applicable to a UK setting.	Used valid and reliable measurement tools; however, there was a lack of information on the concealment and randomisation method.
10. McBride 1999 USA RCT 1+	N= 897 pregnant women were randomised into study groups; they were current smokers or recent quitters at two sites (Seattle and Minnesota). N= 457 Seattle N= 440 Minnesota Women in the trial were predominantly white and married or living as married, with an average age of 28, fewer than 20% had a college education, and 71% had been pregnant before.	1) does relapse prevention intervention during pregnancy result in decreased post-partum relapse rates compared with standard self help intervention? 2) Does a relapse prevention intervention extended into early postpartum period decrease postpartum relapse rates? Funded by National Cancer Institute & National Heart, Blood, Lung & Blood Institute	Pregnant smokers at 2 managed care organisations were randomised to receive a self help booklet only, prepartum relapse prevention, or prepartum and postpartum relapse prevention. Follow up surveys were conducted at 28 weeks of pregnancy and at 8 weeks, 6 months, and 12 months postpartum.	The pre/post intervention delayed but did not prevent postpartum relapse to smoking. Prevalent abstinence was significantly greater for the pre/post intervention group than for the other groups at 8 weeks (booklet group, 30%[a], prepartum group, 35%[b], pre/post group, 39%[b]; p=.02[different superscripts denote differences at p<.05]) and at 6 months (booklet group, 26%[a], prepartum group 24%[a], pre/post group 33%[b], p=.04) postpartum. A nonsignificant reduction in relapse among the pre/post group contributed to differences in abstinence. There was no difference between the groups in prevalent abstinence at 12 months postpartum.	Although this is an American study, given the broad similarities between pregnant smokers in the USA and the UK, the findings are likely to be broadly applicable to a UK setting.	A well conducted study with high response rates. Biochemical markers were used. However, there was a lack of information on concealment and randomisation and differences between groups were present.

11. Mermelstein 2003 USA RCT 1+	N=771- completed the group program (85.2%) and were eligible to be randomised to the condition. Of the 771 who were randomised, 756 were assessed at least once over the follow-up period (3-15 months) and thus available for analyses for this study and considered participants. Sample was mostly European Americans (63.4%), and African Americans (31.5%).	Compare efficacy of 2 types of calls: ones that emphasised supportive, positive reinforcement & efforts toward quitting or maintaining abstinence (basic condition) and the other that was more specifically tailored to stage of quitting process & personal characteristics (enhanced condition). Funded by grant from National Heart, Lung & Blood Institute & from National Cancer Institute.	Basic condition: counsellors gave participants only words of encouragement without specific guidance. Enhanced condition: counsellors' calls varied by participants' smoking status. Smoking behaviour and psychosocial variables were assessed at baseline, at each treatment contact, the end of the group treatment, the end of the telephone call phase and at 3 month intervals thereafter for 15 month follow up.	For men, the enhanced condition produced better biochemically-validated abstinence rates through 15 months and lower relapse rates. For women, the basic condition was better. Among women, 48.8% of were abstinent in the enhanced condition, compared to 43.7% in the basic condition. Among men, 41.6% were abstinent in the enhanced condition, compared to 44.6% in the basic condition. African Americans had significantly lower relapse rates over time than did European Americans. By the end of the 15-month follow up, 45.4% of the African Americans had relapsed, compared with 62.5% of the European Americans who had initially abstained.	This is an American study and it is unclear how relevant its findings are to a UK setting.	Good quality study overall – abstinence rates determined by biochemical validatation rather than self-report measures. But there was a lack of information on % who dropped out and more info was needed on the randomisation and concealment method.

12. Osinubi 2003 USA RCT 1+	N=59 male asbestos workers who smoked N=30 (intervention) N= 29 (control)	Pilot a telephone-based smoking cessation treatment in workers that attended a medical screening for asbestos-related diseases. Funded by the Robert Wood Johnson Foundation.	Intervention group: received brief physician advice to quit smoking and were enrolled in telephone smoking cessation counselling programme. Cessation specialist counselled subjects on behavioural aspects of smoking cessation & made recommendations for adjunct pharmaco-therapies. Control grp: received brief physician advice to quit smoking, written instructions to follow up with physicians, self-help materials and local listing of smoking cessation resource centres. 6 month follow up.	Intent to treat analysis revealed a 16.7% quit rate at 6 months for the intervention group compared to 6.9% for the control group (p=0.25). Treatment received quit-rates were 33% for the intervention group and 6.9% for the control group (p=0.05). the intervention group was twice as likely to use smoking cessation medicines and progressed further along the stage of change continuum compared with the control group.	This is an American study dealing with a very specific sub-population of low income smokers. It is unclear how generalisable its findings are to low income smokers more broadly – or how applicable its findings are to a UK setting.	Well conducted and clear study that outlined randomisation and concealment method. However, there were differences between groups (more Hispanics in intervention group vs. more Asians in control group). Also self report tools were used opposed to biochemical markers.
13. Ossip-Klein 1991 USA RCT 1++	N=1,813 in 10 counties N=919 manual – 63% female, 97.8% white (control) N= 894- manual plus hotline- 63.6% female, 99.3% white (Intervention)	Test the effectiveness of a smokers' hotline as an adjunct to self-help manuals for self-quitters in a 10-county region. Supported by the National Cancer Institute.	All subjects received self-help packet. Subjects in hotline counties were offered access to hotline, given hotline stickers & encouraged to call at each follow-up. The hotline offered 24-hr, 7 day/week messages of support & daily access to counsellors who offered info, support & coping skills. 18 month follow up.	Results show a consistent, significant hotline effect across outcome measures and follow-up periods. The combined programme produced higher biochemically confirmed quit rates at both 12- and 18-month follow-up (12 months: 10% vs. 7.1%, $P < 0.05$); 18 months: 12.1% vs. 7.6%, $P < 0.05$), using both counties and individuals as the units of analysis.	Although this study was conducted in the USA, its findings are likely to be broadly applicable to a UK setting, given the similarity between the quitline described and the UK Quitline.	A very well conducted study with innovative design. Concealment & randomisation addressed through coin toss & biochemical validation as well as validation by a significant other was used.

14. Owen 2000 UK Cross Sectional 2+	N= 3019 (log sheet sample) N= 905 (recall survey sample) Random probability sampling technique providing info on 8500 households and 17000 adults. Subjects=callers to the Helpline	To evaluate the impact of a telephone helpline (Quitline) with additional support (written information) on callers who use the service during a mass media campaign. Funded by the Department of Health.	Quitline callers receive non-directive telephone counselling to encourage them to learn from their own experience, identify reasons for any previous failed attempts and coping techniques. If the capacity of the bureau is exceeded, callers are transferred to a messagelink which allows callers to leave their names and addresses.	Callers were more likely to be women (at one year= 72%, 95% CI 68.74 to 75.26), to be in the age groups 25-34 (32%, 95% CI 28.62 to 35.38) or 35-44 (31%, 95% CI 25.71 to 32.29), to come from households with children under the age of 16 years (50%, 95% CI 46.37 to 53.63), and to be heavy smokers (smoke 20 or more cigarettes per day). At one year, the social class profile of callers reflected the social class profile of all adult smokers; 63% were manual workers or unemployed compared with 61% of the adult smoker population. At one year, 22% (95% CI 18.4% to 25.6%) of smokers reported that they had stopped smoking. After adjusting quit rate based on the assumption that those who refused to take part in the one year follow up were continuing smokers, the quit rate was 15.6% (95% CI 12.7% to 18.9%). The main characteristics associated with not smoking at one year were social class ABC1, light smokers and being male.	As this is a UK study, its results are directly relevant to a UK setting.	A well conducted study based on a representative sample of smokers to the Quitline. However, results are based on self-reported smoking status and are subject to possible desirability bias.

15. Pan 2006 International Meta-analysis 1+	Review of 22 controlled studies on adult smokers.	To quantitatively synthesise the evidence on the effectiveness of proactive telephone counselling as an adjunct to minimal interventions for smoking cessation. No conflicts of interest. No funding source listed.	Any controlled studies in which proactive telephone counselling was used as an adjunct to minimal interventions such as self-help materials. Follow up periods in included studies: 3 to 34 months.	Proactive telephone counselling is effective as an adjunct to other minimal interventions, although interventions were less effective for older (B = -0.02, t = -5.00, P < 0.001), female (B = -0.69, t = -3.45, P < 0.001) and heavier smokers (B = -0.05, t = -7.29, P < 0.001).	This is an international review of the evidence and its findings are therefore likely to be applicable to a UK setting.	Overall, a well conducted meta-analysis that draws only on RCTs. 10 of the 22 studies included biochemical validation.
16. Platt 1997 UK (Scotland) Cross Sectional 2+	N=8547 (10% systematic random sample of all calls from adults over 12 months) From this 10%, a group of 970 (848 or 8.4% were current smokers) were randomly sampled to follow up at three points in time.	Examines the effectiveness of the Smokeline campaign launched by the Health Education Board of Scotland during the first year of operation in three respects: adult uptake of the service provided; change in smoking behavior among adult callers, and impact on overall prevalence of smoking among adults in Scotland. Funded by the Health Education Board for Scotland.	The Smokeline campaign has three components: 1) Smokeline – a telephone service* 2) You Can Stop Smoking – a self help guide to stopping smoking 3) Mass media advertising including television, outdoor posters and press. *Further information about the elements of the telephone intervention are not provided.	N=49660 (60%) of 82782 adult callers to the quitline were women, compared with 52% of general adult population of Scotland. Callers to smokeline were younger than Scottish adult (16-44 years) general population as whole (41% vs. 54% respectively). Over 2/3's of callers had tried to stop in past, while 58% were desperate to stop at time of call, and 1/3 claimed that they would do so immediately. Consumption of cigarettes among callers was particularly high with 56% smoking 20 or more a day (compared with 42% of smokers in the adult Scottish population). 34.4% (26.4% to 42.2%) of those who were non-smokers at 12 months had stopped smoking for at least 80% of the period. This figure equates to 8.2% (6% to 10.4%) of the total sample.	As this is a UK study, its results are directly relevant to a UK setting.	Study was well conducted-missing data was accounted for, good participation rate, and a random sample was used. However, it relies on self-reported smoking status at follow up, which may be subject to desirability bias.

17. Prout 2002 USA Case Report 3+	N=23938 smokers completed assessments for the Massachusetts Smokers Quitline.	Compares smokers who completed the assessment for the Quitline to smokers in the general population in Massachusetts. Funded by the American Cancer Society, by the National Cancer Institute and National Institutes of Health.	The Quitline includes information about smoking cessation, referral to community-based tobacco treatment services, printed materials, and telephone counselling to smokers, recent quitters, family, friends and health service providers of smokers.	The vast majority of Quitline callers planned to quit within 30 days (93%), were daily smokers (98.1%), who smoked a median of 23 cigarettes per day. 40% had their first cigarette immediately upon awakening and an additional 33% smoked within 30 minutes. The proportion of daily smokers was significantly lower in the Massachusetts Behaviour Risk Factor Surveillance System data. Demographically, quitline callers who were overrepresented in relation to their broader smoking rates were women (60.2% of callers vs. 50.9% of smoking population), young people (9.8% of callers vs. 2.3% of smoking population) and diverse populations (15% of callers vs. 11.7% of smoking population).	Although this is an American study, it describes a telephone quitline similar to the UK Quitline. It is also likely that smokers with similar characteristics call quitlines in both countries. Therefore the results are likely to be broadly applicable to a UK setting.	Study was represented as a 'brief report'. Although there is no NICE checklist for case reports, the report was qualitatively deemed to be of reasonable quality by 2 reviewers.
18. Rabius 2004 USA RCT 1-	N=3500 smokers N=420 smokers aged 18-25 (12% of total) Other demographic characteristics of participants not outlined.	Examines the effects of telephone counselling on smoking cessation among smokers 18-25 years old and smokers over 25 years old. No funding source listed.	Smokers randomised to receive either self-help booklets through the mail or booklets and up to 5 sessions of phone counselling. 3-month follow up based on self-reported smoking status.	Using intent to treat analysis, 3 and 6 month quit rates among both younger & older smokers was significantly higher among those who received telephone counselling than those who received self help booklets only. Three month rates were 20% versus 9% for the 18-25 year olds and 15% versus 10% for the older adults. Among the younger age group, treatment condition was the only significant ($p < 0.01$) predictor of abstinence during the 48 hours preceding the 3-month follow-up interview. Results were not sex disaggregated.	Although this is an American study, young adults in both populations are likely to be broadly culturally similar in relation to smoking and cessation activities. Therefore, the results seem broadly applicable to a UK setting.	Study does not compare baseline characteristics or results of control group with intervention group. Concealment method is not outlined and smoking status is based on self-report.

19. Rigotti 2006 USA RCT 1++	N= 442 pregnant smokers were randomly assigned to either the intervention group (N= 220) or best practice control (N=222)	To test the efficacy of a proactive pregnancy-tailored telephone counselling intervention for pregnant smokers who were recruited from a prenatal care practices and a management care organization. 80% power Funded by the Robert Wood Johnson's Foundation SmokeFree Families Program and a National Heart, Lung and Blood Institute Midcareer Investigator Award in Patient Oriented Research.	Trained counsellors using cognitive-behavioural and motivational interviewing methods called intervention subjects throughout pregnancy and for 2 months postpartum (mean= 5 calls, mean total contact= 68 minutes). Control received one 5-minute counselling session. Compared participants in proactive pregnancy-tailored telephone counselling intervention versus the best practices control group. Follow up at 2 months post-partum	Cotinine-validated 7-day tobacco abstinence results in intervention and control groups were 10% and 7.5% at the end of pregnancy (OR 1.37, 95% CI 0.69-2.70; number needed to treat =40) and 6.7% versus 7.1% at three months postpartum (OR=0.93, 95% CI 0.44-1.99). the intervention increased end of pregnancy cessation rates among 201 light smokers (<10 cigarettes/day at study enrolment) (intervention 19.1% versus control 8.4%; OR 2.58, 95% CI 1.1-6.1; number needed to treat= 9.3) and among 193 smokers who attempted to quit in pregnancy before enrolment (intervention 18.1% versus control 6.8%; OR 3.02, CI 1.15-7.94; number needed to treat -8.8); 63% of the sample was in one of these sub-groups.	Although this is an American study, given the broad similarities between pregnant smokers in the USA and the UK, the findings are likely to be broadly applicable to a UK setting.	No methodological concerns. Very well conducted study, which described all components clearly and used biochemical markers to ascertain smoking status.

20. Solomon 2000 USA RCT 1+	N=151 pregnant women who smoked at least one cigarette in the last week when screened at their first prenatal visit. N= 74 (Comparison condition) N= 77 (experimental condition) Participants tended to be white, English speaking, and of lower income and education.	To test the impact of a proactive telephone peer support added to physician/midwife advice to help pregnant women stop smoking. Supported by a grant from the Robert Wood Johnson Foundation, Smoke-free Families Program.	Women in the comparison condition received brief smoking cessation advice delivered by an obstetrician/midwife at the first three prenatal visits along with stage appropriate printed materials. Women in the experimental condition received the same advice and materials plus offer of telephone peer support for women with moderate to high intentions of quitting smoking during the pregnancy. Participants were assessed by the nurse interviewer at the beginning of their first, second, third, fourth, and end of pregnancy prenatal visits to determine smoking status. Follow up: end of pregnancy	Intention to treat analysis included all 151 women and counted those lost to follow up as smokers. The analysis revealed that 14 women in the experimental condition (18.2%) and 11 women in the comparison condition (14.9%) were verified as having quit smoking, a non-significant relationship. Of the 151 women enrolled, 16 (10.6%) could not be reached for the end of pregnancy assessment, with no significant difference between conditions. Analysis from the 135 women reached for the end of pregnancy assessment revealed no significant differences between experimental and control participants, respectively, on abstinence (19% vs. 17%), reduction in smoking of greater than 50% from first prenatal visit (42% vs. 44%), or on advancement in stage of change (31% vs. 21%) (all $p > 0.1$).	Although this is an American study, given the broad similarities between pregnant smokers in the USA and the UK, the findings are likely to be broadly applicable to a UK setting.	Well conducted study that used self report and biochemical validation. However, there were differences between the women who were lost to follow up and those who remained in the study. Women lost to follow up had lower a mean level of education.

21. Solomon 2000 USA RCT 1+	N=214 Medicaid-eligible women smokers of childbearing age Eligibility: 18-50 years old, Medicaid income eligible, smoked greater than 4 cigarettes per day; adequate command of English, had high intentions of quitting in the next 2 weeks, had a home phone and live in Chittenden county and not have plans to move within the next 6 months, not currently using NRT and have no health problems associated with using the patch.	To test the impact of free nicotine patches plus proactive telephone peer support to help low-income women stop smoking. Funded by the Vermont Department of Health.	214 women were randomised to receive free nicotine patches through the mail or free nicotine patches through the mail plus the provision of proactive support by phone from a woman ex-smoker for up to 3 months (1st call day before quit day; 2nd call on or shortly after quit day; 3rd call 4 days later; subsequent calls on weekly to bi-weekly basis for up to 3 months). Assessments were conducted at baseline, 10 days, and 3 and 6 months after enrolment.	At three month follow up, significantly more women in the patch plus proactive telephone support condition were abstinent (42%) compared to the patch only condition (28%) (p=0.03). Similarly, more women in the experimental condition were abstinent at both the 10-day and 3-month assessments (32 v 19%, p=0.02). However, differences were not found at the 6-month follow up, suggesting that the addition of proactive telephone peer support enhanced short-term, but not long term cessation.	Although this is an American study, smoking in both countries is increasingly concentrated in low income populations who share many similar characteristics. Therefore, the findings of this study are likely to be broadly applicable to a UK setting.	A well conducted study that used biochemical validation. However, not enough information was given on randomisation and concealment methods.

22. Solomon 2005 USA RCT 1+	N=330 low income women N= 171 experimental N= 159 control	The objective of this study is to determine if longer telephone support (up to 12 calls over 4 months) when added with the provision of free nicotine patches, would significantly enhance abstinence at 6 months over the provision of nicotine patches alone. Funded by the Vermont Department of Health.	Women were randomly assigned to receive either free nicotine patches (control condition) or free nicotine patches with up to 16 weeks of proactive telephone support (experimental condition). All participants were assessed by phone at baseline and at 2 weeks, 3 months, and 6 months post-baseline to determine smoking status.	Results revealed a significant effect for the telephone support at 3 months, with 43% of experimental versus 26% of control condition women reporting 30-day point prevalence abstinence (p=0.002). The difference was no longer significant at 6 months. A meta-analysis conducted with 5 randomized studies revealed a slight but non-significant long term benefit of proactive telephone support when added to the provision of free nicotine patches for smoking cessation.	Although this is an American study, smoking in both countries is increasingly concentrated in low income populations who share many similar characteristics. Therefore, the findings of this study are likely to be broadly applicable to a UK setting.	Well conducted study however, self report data was used and not enough information was given about concealment and randomisation. Differences between groups also existed (i.e. living with someone who smokes).

23. Stead 2006 International Cochrane Review 1++	48 trials met the inclusion criteria. Participants included smokers or recent quitters. Trials that exclusively recruited quitters or were focused on telephone counselling as an intervention for relapse were excluded from the review.	1) Do telephone calls from a counsellor increase quit rates compared to other cessation interventions alone? 2) Do telephone calls from a counsellor increase quit rates compared to pharmacotherapy alone? 3) Does an increase in the number of telephone contacts increase quit rates? 4) Do differences in counselling protocol related to the type or timing of support lead to differences in quit rates? 5) Does the availability of a reactive helpline increase quit rates?	Provision of proactive or reactive telephone counselling to assist smoking cessation, to any population. Studies were excluded if the contribution of the telephone component could not be evaluated independently of face-to-face counselling.	Quit rates were higher for groups randomised to receive multiple sessions of call-back counselling (8 studies >18,000 participants, OR 1.41, 95% CI 1.27 to 1.57). Telephone counselling not initiated by calls to helplines also increased quitting (29 studies, >17,000 participants, OR 1.33, 95% CI 1.21 to 1.47). A meta-regression detected a significant association between the maximum number of planned calls and the effect size.	This is an international review of the evidence and its findings are therefore likely to be applicable to a UK setting.	Although the Cochrane reviews do not disaggregate intervention effects by sex, ethnicity, social class, etc, they represent the benchmark for evidence-based medicine and reviews are conducted to extremely high standards.

24. Stotts 2002 USA RCT 1+	N= 269 'resistant' pregnant smokers N= 134 (intervention) N= 135 (Control)	To determine the efficacy of an intensified, late pregnancy, smoking cessation intervention for resistant pregnant smokers. No funding source listed.	All participants received 3-5 minutes of counselling plus a self help booklet at their first prenatal visit and seven booklets mailed weekly thereafter. The experimental group received stage of change-based, personalised feedback letter and two phone counselling calls using motivation interviewing strategies. The control group received care as usual. Follow up 3- and 6-months postpartum	The 34th week cotinine data demonstrated no overall difference between groups. However, an implementation analysis suggested that 43% of the women who received the full intervention (E2) were classified as non-smokers compared to 34% of the control group. At 6 weeks postpartum, 27.1% of the E2 group reported being abstinent or light smokers vs. 14.6% of the controls. No differences were detected at 3 and 6 months postpartum. Results lend preliminary but very modest support for this intervention with resistant pregnant smokers.	Although this is an American study, given the broad similarities between pregnant smokers in the USA and the UK, the findings are likely to be broadly applicable to a UK setting.	Well conducted study that used biochemical validation. However, there was a lack of information on concealment method and differences existed between groups (experimental group= heavier smokers).
25. Swartz 2005 USA Cross Sectional 2+	N= 535 smokers in Maine using treatment services from the Maine Tobacco Helpline.	To examine the use of treatment services, evaluated quit outcomes and estimated the population impact of treatment. No funding source listed.	HelpLine provides toll-free counselling to any tobacco user who is ready to quit in ≤ 30 days or has recently quit. Callers connected live or scheduled for 1st counsel-ing session with specialist using motiv-ational interviewing & cognitive-behavioural counselling techniques, teaches coping skills, develops individual quit plans & discusses NRT options. 6-month followup	A total of 12,479 adult smokers (3% of smokers annually) used Maine's tobacco services during 2003-2004. Compared to smokers state-wide callers were more likely to be aged 45-64, female or uninsured. A total of 28% of callers who were eligible for NRT and received counselling obtained free NRT. Intent to treat quit rates at 6 months were 12.3% (95% CI, [CI]=8.1-17.6) for counselling and 22.5% (95% CI=19.1-26.3) for counselling plus NRT. An estimated 1864 smokers calling in 2003-2004 had successfully quit.	Although this is an American study, it describes a telephone quitline similar to the UK Quitline. It is also likely that smokers with similar characteristics call quitlines in both countries. Therefore the results are likely to be broadly applicable to a UK setting.	A well conducted study. However, results are based on self-reported smoking status and are subject to possible desirability bias.

26. Tomson 2006 Sweden Economic evaluation + rating	N = 1131 callers enrolled in the national Swedish quitline	To examine the cost-effectiveness of the Swedish quitline. No specific funding source for the study is outlined. No competing interests are declared.	The quitline offers telephone counselling. When the lines are busy an answering machine and 24-hour interactive voice response serve as a back-up.	The accumulated number of life years saved in the study population was 2400. The cost per quitter was 1052-1360 USD, and the cost per life year saved was 311-401 USD. A sensitivity analysis showed that, for outcomes down to an abstinence rate of 20%, the cost per LYS rose modestly from 311 to 482 USD. Discounting the cost per LYS showed the cost to be 135 USD for 3% and 283 USD for 5%.	The results are from a Swedish study. However, the national Swedish quitline is similar to the UK model and results are likely to be broadly comparable to a UK setting.	A solid study.
27. Vidrine 2005 USA RCT 1++	N=95 HIV positive participants were randomised to the trial (48=cell phone intervention and 47=regular care). For both groups, mean age was 42.8 years; 77.9% male, 71.6% Black.	To assess efficacy of innovative smoking cessation intervention targeted to a multi-ethnic, economically disadvantaged HIV-positive population. Funded by cancer prevention fellowship supported by National Cancer Institute & Margaret & James A. Elkins, Jr. Faculty Achievement Award in Cancer Prevention.	Usual care group received brief physician advice to quit smoking, targeted self-help written materials and NRT. The cell phone intervention received 8 counselling sessions delivered by cell phone in addition to the usual care components. Smoking related outcomes were assessed at 3-month follow up.	Biochemically verified point prevalence smoking abstinence rates of 10.3% for the usual care group and 3.6% for the cell phone group; participants who received the cell phone intervention were 3.6x (95% CI, 1.3-9.9) more likely to quit smoking compared with participants who received usual care (P=0.0059). Results were not sex-disaggregated.	This is an American study dealing with a very specific sub-population of low income smokers. It is unclear how generalisable its findings are to low income smokers more broadly – or how applicable its findings are to a UK setting.	No method-ological concerns. Study very well conducted & used appropriate concealment and randomisation methods. Smoking status was confirmed by biochemical validation.

28. Wadland 2001 USA RCT 1+	N=238 low income smokers in Medicaid managed care N=123 Usual care group (control); N= 110 telephone counselling group (intervention) The majority of the study population (233 adults with phones) were white (64%), women (70%) with annual incomes of less than $10,000 (79%) and with prescriptions of nicotine replacement therapy (>90%).	Evaluates the effectiveness of usual care (physician-delivered advice and follow-up) and usual care enhanced by 6 computer assisted telephone counselling sessions by office nurses and telephone counsellors for smoking cessation in very low income smokers in Medicaid managed care. Supported by a grant from the Michigan Department of Community Health.	Usual care: physician-delivered advice and follow-up and usual care. Enhanced care: usual care plus 6 computer assisted telephone counselling sessions. 3-month follow up.	At 3 months, quit rates (smoke free status verified by carbon monoxide monitors) were 8.1% in the usual care group and 21% in the telephone-counselling group (p=0.009) by intention to treat analysis. Special tracking methods were successful at keeping participants in treatment. Results were not sex-disaggregated.	Although this is an American study, smoking in both countries is increasingly concentrated in low income populations who share many similar characteristics. Therefore, the findings of this study are likely to be broadly applicable to a UK setting.	Well conducted study that used biochemical validation. Lacking information on concealment; however a nice diagram presenting randomization and recruitment was provided.

29. Wakefield 2002 Australia Case Report 3+	The paper is a general discussion of telephone quitlines – so specific populations are described.	To discuss the role of telephone quitline services in the context of mass-media anti-smoking campaigns. No funding source listed.	Helplines use a combination of live counsellors, answering bureaus, and message bank facilities, depending upon funding and perceived importance of answering every call with a live person. In addition, calls are usually free or at minimal charge to smokers.	The authors discuss four relevant effects of telephone quitlines in the context of mass-media anti-smoking campaigns: 1) Advertising stimulates call volume 2) Helplines have an important symbolic role in telling smokers that quitting is so important there are dedicated services to support them 3) A priority must be placed on answering every call: athough callers have disparate needs, most callers seek minimal advice. 4) Helplines promote easy access for all	Although this commentary is based on the authors' experience with an Australian quitline, given the similarities between the Australian and British quitlines, the results are likely to be broadly applicable to a UK setting.	This paper is a commentary on the role of telephone quitlines in the context of a mass-media campaign, based on the authors' experience in an Australian context. Although there is no NICE checklist for case reports, the report was qualitatively deemed to be of reasonable quality by 2 reviewers.

30. Wetter 2006 USA RCT 1+	N=297 Spanish-speaking smokers accessing the Spanish-language smoking cessation counselling service provided by the National Cancer Institute's Cancer Information Service. Participants were randomised to either standard counselling (N=149) or enhanced counselling (N=148). Demographics: 55% M; average age: 41; education: 11 years; average no. of cigarettes per day: 10. 3 month follow up period.	To explore the reach and effectiveness of telephone counselling for Hispanic smokers. Supported by funding from the Minority Health Research and Education Programme of the Texas Higher Education Coordinating Board and by grant from the National Cancer Institute.	Standard counselling (SC): consisted of a single CIS counselling session delivered during the initial call to the CIS, plus an offer of Spanish-language self-help materials to be mailed to the participant if desired. Enhanced counselling (EC): consisted of SC plus 3 additional proactive counselling calls focusing on identification of triggers to smoke and high risk situations, as well as coping strategies for dealing with those situations. Motivational interviewing techniques were also included.	The unadjusted effect of EC only approached significance (OR = 2.4, *P* = 0.077) but became significant after controlling for demographic and tobacco-related variables (OR = 3.8, *P* = 0.048). The researchers conclude that a proactive, telephone counselling programme is effective for Hispanic smokers.	As the USA has a very different ethnic composition to the UK, it is unclear how relevant the results of this study are to a UK setting.	Overall, a good quality study. However, estimations of abstinence rates rely on self-report measures. Also, follow up period is only 3 months. Inadequate information on randomisation and concealment method.

31. Zhu 2000 USA Case Report 3+	N=117,000 calls from August 1992 to December 1999.	To provide an overview of the California Smokers' Helpline. Funding was provided by the California Department of Health Services, Tobacco Control Section.	Programme services, offered free of charge to all Californians, include individual counselling, self-help materials, information related to tobacco cessation, and referral to local services. Separate toll-free numbers are provided in English, Spanish, Vietnamese, Korean and Chinese (for Mandarin and Cantonese speakers).	Overall, helpline callers were more likely to be female. Tobacco users of all ages were well represented in the helpline, although Helpline callers were slightly younger than the general smoking population. With regard to ethnicity, African-American callers were overrepresented while the reverse was true for Hispanic calls. Overall, minority callers were underrepresented (by about 5%). Compared to smokers in the general population, helpline calls were more addicted.	Although this is an American study, it describes a telephone quitline similar to the UK Quitline. It is also likely that smokers with similar characteristics call quitlines in both countries. Therefore the results are likely to be broadly applicable to a UK setting.	Study was represented as commentary. Although there is no NICE checklist for case reports, the report was qualitatively deemed to be of reasonable quality by 2 reviewers.
32. Zhu 2002 USA RCT 1+	N=3282 participants who called the California Smokers' Helpline 60% randomised to treatment group (N=1973); 40% to control group (N=1309).	Study examines the real-world effectiveness of the California Smokers' Helpline. Study supported by funds received from Tobacco Tax Health Protection Act of 1988, under a grant from the California Department of Health Services.	All participants were sent package of self-help materials & were instructed to call back to start counselling once received. Control subgroup A: subjects who called back were assigned a counsellor; Control subgroup B: subjects who did not call back & did not receive counselling; Treatment subgroup A: 1st session - set quit date; up to 6 sessions followed (within 3 months) emphasising relapse prevention. Follow-up 2, 4, 7 and 13 months after 1st contact	At 4 month follow up, 12.1% of controls and 17.9% of treatment group were abstinent based on self-reported smoking status; at 7 months 8.6% of controls and 12.8% of treatment group were abstinent; at 13 months 6.9% of controls and 9.1% of treatment group were abstinent ($P < 0.001$). Analyses factoring out both the subgroup of control subjects who received counselling and the corresponding treatment group indicate that counselling approximately doubled abstinence rates ($P < 0.001$).	Although this is an American study, it describes a telephone quitline similar to the UK Quitline. Therefore, the results are likely to be broadly applicable to a UK setting.	This study offers a method-ologically innovative and sophisticated way to test the effectiveness of a reactive quitline under controlled conditions. However, smoking status was ascertained through self-report and may be subject to desirability bias.

7. APPENDIX A – Search Terms, Databases and Processes

Pubmed Search Engine

hotline smoking	104	March 12, 2007
hotline tobacco	51	
phone counseling smoking	108	
phone counseling tobacco	43	
phone counselling smoking	108	
phone counselling tobacco	43	
quitline smoking	55	
quitline tobacco	32	
telephone counseling smoking	269	
telephone counseling tobacco	127	
telephone counselling smoking	269	
telephone counselling tobacco	127	
telephone smoking intervention	347	March 14, 2007
telephone support smoking cessation	468	
telephone support tobacco cessation	414	
telephone tobacco intervention	161	
helpline smoking	25	
helpline tobacco	20	
phone smoking intervention	115	
phone support smoking cessation	142	
phone support tobacco cessation	126	
phone tobacco intervention	53	

DARE March 14, 2007

Hotline smoking 2 refs
Hotline tobacco 2 refs
Quitline tobacco 2 refs
Quitline smoking 3 refs
Helpline smoking 2 refs
Helpline tobacco 2 refs
Phone counselling smoking 6 refs
Phone counseling smoking 1 ref
Telephone counseling smoking 11 refs
Telephone counselling smoking 22 refs
Telephone counselling tobacco 12 refs
Telephone counseling tobacco 5 refs
Phone counseling tobacco 0 refs
Phone counselling tobacco 1 ref
Phone support smoking cessation 4 refs
Telephone support smoking cessation 20 refs
Telephone support tobacco cessation 11 refs
Phone support tobacco cessation 0 refs
phone smoking intervention 9 refs

phone support smoking cessation 4 refs
phone support tobacco cessation 0 refs
phone tobacco intervention 3 refs

Psycinfo March 15, 2007
Hotline smoking 1
Hotline tobacco 0
Quitline tobacco 19
Quitline smoking 23
Helpline smoking 13
Helpline tobacco 13
Phone counselling smoking 0
Phone counseling smoking 15
Telephone counseling smoking 114
Telephone counselling smoking 8
Telephone counselling tobacco 6
Telephone counseling tobacco 78
Phone counseling tobacco 12
Phone counselling tobacco 0
Phone support smoking cessation 11
Telephone support smoking cessation 71
Telephone support tobacco cessation 5
Phone support tobacco cessation 2
phone smoking intervention 28
phone tobacco intervention 21
Telephone smoking intervention 188
Telephone tobacco intervention 134

8. APPENDIX B – Excluded Studies

Paper	*Reason for exclusion*
Brandon, T. H., Moffat, H. L., Collins, B. N., Juliano, L. M., & Lazev, A. B. (2000). Preventing relapse among former smokers: A comparison of minimal interventions through telephone and mail. *Journal of Consulting and Clinical Psychology, 68,* 103-113.	No outcomes of interest and deals with relapse.
Britt, J., Curry, S. J., McBride, C., Grothaus, L., & Louie, D. (1994). Implementation and acceptance of outreach telephone counseling for smoking cessation and nonvolunteer smokers. *Health Education Quarterly, 21,* 55-68.	No other outcomes of interest - covered by the Cochrane Review.
Camenga, D. R., & Klein, J. D. (2004). Adolescent smoking cessation. *Current Opinion in Pediatrics, 16,* 368-372.	Non-systematic review.
Curry, S. J., McBride, C., Grothaus, L. C., Louie, D., & Wagner, E. H. (1995). A randomized trial of self-help materials, personalized feedback, and telephone counseling with nonvolunteer smokers. Journal of Consulting and Clinical *Psychology, 63,* 1005-1014.	No other outcomes of interest - covered by the Cochrane review.
Delnevo, C. N., Foulds, J., Vorbach, U., & Kazimir, E. (2006). Seasonal variations in stage of change among Quitline clients. *Tobacco Control, 15,* 70-71.	No outcomes of interest.
Elder, J. P., Wildey, M., de Moor, C., Sallis, J. F., Eckhardt, L., Edwards, C. et al. (1993). The long-term prevention of tobacco use among junior high school students: Classroom and telephone interventions. *American Journal of Public Health, 83,* 1239-1244.	Article covers an intensive face-to-face intervention. Phone counselling is a minor adjunct.
Hughes, J. R., Riggs, R. L., Carpenter, M. J. (2000). How helpful are drug abuse helplines? *Drug and Alcohol Dependence, 62,* 191-194.	Article explores helplines for a variety of drugs – smoking cessation helplines are a small component of the study.
Jaen, C. R., Cummings, M., Zielezny, M., & O'shea, R. (1993). Patterns and Predictors of smoking cessation among users of a telephone hotline. *Public Health Reports, 108*, 772-778.	No outcomes of interest.
Kinne, S., Thompson, B., & Wooldridge, J. A. (1991). Response to a telephone smoking information line. *American Journal of Health Promotion, 5,* 410-413.	No relevant outcomes of interest and could not be rated.
Lando, H. A., Pirie, P. L., Roski, J., McGovern, P. G., Schmid, L. A. (1996). Promoting abstinence among relapsed chronic smokers: The effect of telephone support. The American Journal of Public Health, 86, 1786-1790.	Article explores relapse prevention among smokers who quit through face-to-face programmes.
Lando, H. A., Valanis, B. G., Lichtenstein, E., Curry, S. J., McBride, C. M., Pirie, P. L. et al. (2001). Promoting smoking abstinent in pregnant and postpartum patients: a comparison of 2 approaches. *The American Journal of Managed Care, 7,* 685-693.	Accompanies McBridge (1999) and does not report on further outcomes of interest.
Lazev, A. B., Vidrine, D. J., Arduino, R. C., & Gritz, E. R. (2003). Increasing access to smoking cessation treatment in a low-income, HIV-positive population: The feasibility of using cellular telephones. *Nicotine and Tobacco Research, 6,* 281-286.	Accompanies Vidrine (2006) and does not report on further outcomes of interest.
Leed-Kelly, A., Russell, K. S., Bobo, J. K., & McIlvain, H. (1996). Feasibility of smoking cessation counselling by phone with	Deals with subpopulations with

alcohol treatment center graduates. *Journal of Substance Abuse Treatment, 13,* 203-210.	alcohol problems - not a target population of this review.
McAlister, A. L., Rabius, V., Geiger, A., Glynn, T. J., Huang, P. & Todd, R. (2004). Telephone assistance for smoking cessation: One year cost effectiveness estimations. *Tobacco Control, 13,* 85-86.	Not able to rate and examines the cost of quitlines, not the effectiveness.
Mcilwain, J. (2002). Tobacco Quitline Mississippi 1-800-244-9100. *Journal of the Mississippi State Medical Association, 43,* 358-359.	Article only describes a telephone quitline and encourages smokers to call.
Miguez, C., Vasquez, F. L., & Becona, E. (2001). Effectiveness of telephone contact as an adjunct to a self-help program for smoking cessation: A randomized controlled trial in Spanish smokers. *Addictive Behaviors, 27,* 139-144.	Study conducted in Spain and minority subpopulations are not explored.
Obermayer, J. L., Riley, W. T., Asif, O., & Jean-Mary, J. (2004). College smoking-cessation using cell phone text messaging. *Journal of American College Health, 53,* 71-78.	Study examines text messaging. Not an intervention-type covered in the review.
Owen, N., & Davies, M. J. (1990). Smokers' preferences for assistance with cessation. *Preventive Medicine, 19*, 424-431.	Not able to obtain a copy of the full article.
Paul, C. L., Wiggers, J., Daly, J. B., Green, S., Walsh, R. A., Knight, J., et al. (2004). Direct telemarketing of smoking cessation interventions: Will smokers take the call? *Addiction, 99,* 907-913.	Article deals with attitudes towards telemarketing, not towards telephone support for cessation.
Segan, C. J., Borland, R., & Greenwood, K. M. (2006). Can transtheoretical model measures predict relapse from the action stage of change among ex-smokers who quit after calling quitlines? *Addictive Behaviors, 31,* 414-428.	Looks at predictors of relapse among smokers. Not an outcome of interest.
Shuster, G. (2005). 4 interaction dynamics occurred in telephone counseling for smoking cessation. *Evidence Based Nursing, 8,* 31.	No relevant outcomes.
Solomon, L. J. & Flynn, B. S. (2005). Telephone support for pregnant smokers who want to stop smoking. *Health Promotion Practice, 6,* 105-108.	Descriptive article on a helpline for pregnant smokers.
Stretcher, V. J., Marcus, A., Bishop, K., Fleisher, L., Stengle, W., Levinson, A., et al. (2005). A randomized controlled trial of multiple tailored messages for smoking cessation among callers to the Cancer Information Service. *Journal of Health Communications, 10,* 105-118.	Deals only with the differing efficacy of printed material types.
Smith, P.M., Cameron, R., McDonald, P.W., Wawash, B., Madill, C. & Brown, S. (2004). Telephone counseling for population-based smoking cessation. *American Journal of Health Behavior*, 28(3): 231-241.	Deals with a reactive quitline with proactive calls and is covered by Cochrane Review.
Tomson, T., Bjornstrom, C., Gilljam, H., & Helgason, A. (2005). Are non-responders in a quitline evaluation more likely to be smokers? *BMC Public Health, 5,* 52.	No relevant outcomes.
Winickoff, J. P., Tanski, S. E., McMillen, R. C., Hipple, B. J., Friebely, J., & Healey, E. A. (2006). A national survey of the acceptability of quitlines to help parents quit smoking. *Pediatrics, 117,* 695-700.	Deals with the acceptability of quitlines to parents. No relevant outcomes.

9. APPENDIX C

Methodology checklist: Cross-sectional studies

Adapted from CPHE Methods Manual Cohort Analysis Methodology Checklist and Thomson, B; Diamond, K.E.; McWilliam, R; Snyder, S.W. (2005) Evaluating the Quality of Evidence from Correlational Research for Evidence-Based Practice, *Exceptional Children*, 71(2): 181-194.

Study identification *Include author, title, reference, year of publication*	
Guideline topic:	**Key question no:**
Checklist completed by:	

1a. Are the objectives of the study stated?	Well covered Adequately addressed Poorly addressed	Not addressed Not reported Not applicable
1b. Are the hypotheses of the study stated?	Well covered Adequately addressed Poorly addressed	Not addressed Not reported Not applicable
2. Is the sampling frame defined?	Well covered Adequately addressed Poorly addressed	Not addressed Not reported Not applicable
3. Is the analytic sample defined?	Well covered Adequately addressed Poorly addressed	Not addressed Not reported Not applicable
4. Are the dates between which the study was conducted stated or implicit?	Well covered Adequately addressed Poorly addressed	Not addressed Not reported Not applicable
5. Are eligibility criteria stated?	Well covered Adequately addressed Poorly addressed	Not addressed Not reported Not applicable

6. Is the sampling method mentioned?	Well covered Adequately addressed Poorly addressed	Not addressed Not reported Not applicable
7. Is the numbers of participants justified? (what is the power calculation?)	Well covered Adequately addressed Poorly addressed	Not addressed Not reported Not applicable
8. Are the numbers meeting and not meeting the eligibility criteria stated?	Well covered Adequately addressed Poorly addressed	Not addressed Not reported Not applicable
9. For those not eligible, are the reasons why stated?	Well covered Adequately addressed Poorly addressed	Not addressed Not reported Not applicable
10a. Was the number of the analytic sample at the beginning of the study stated? Actual N:	Well covered Adequately addressed Poorly addressed	Not addressed Not reported Not applicable
10b. What is the participation rate? (above 60% is well covered)	Well covered Adequately addressed Poorly addressed	Not addressed Not reported Not applicable
11a. Was the reliability (repeatability) of the measurement methods mentioned for the exposure?	Well covered Adequately addressed Poorly addressed	Not addressed Not reported Not applicable
11b. Was the reliability (repeatability) of the measurement methods mentioned for the outcomes? (e.g. has the measure been used before?, if observational was there inter-rated reliability?)	Well covered Adequately addressed Poorly addressed	Not addressed Not reported Not applicable
12a. Was the validity of the measurement methods mentioned for the exposure?	Well covered Adequately addressed Poorly addressed	Not addressed Not reported Not applicable

12b. Was the validity of the measurement method mentioned for the outcome?	Well covered Adequately addressed Poorly addressed	Not addressed Not reported Not applicable
13. Was the type of analyses conducted stated?	Well covered Adequately addressed Poorly addressed	Not addressed Not reported Not applicable
14. Were confounders accounted for in analyses? (multivariate analysis)	Well covered Adequately addressed Poorly addressed	Not addressed Not reported Not applicable
15. Were missing data accounted for in the analyses? (Did they deal with people who were not eligible or had incomplete surveys, etc).	Well covered Adequately addressed Poorly addressed	Not addressed Not reported Not applicable
16. How reliable are the results? (If neither the exact p value not the confidence intervals were reported than poor).		
17. **Overall Assessment of Study.** How well was the study done to minimise the risk of bias or confounding, and to establish a relationship between the variables under consideration? Code ++, + or -		

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