Supplementary Table 1: Key search terms for systematic review on Health Providers' Practices for Smoking Cessation Care in Pregnancy

Health Professional	**Attitudes and Practices**	**Smoking**	**Pregnancy**
Allied health personnel	Health Knowledge, Attitudes, Practice	Tobacco dependence treatment	Maternal behaviour
General practitioner	Attitude of Health Personnel	Maternal tobacco smoking	Perinatal Care
Medical practitioner	Knowledge	Smoking Cessation	Pregnancy
Health Professional	Perception	Tobacco use disorder	Maternal
Health personnel	Practice	Nicotine dependence	Mother
Family Practice	Belief	Smoking treatment	Preg*
Specialist	Capacity	Smoking	Antenatal
Physician	Capability	Smok*	
Doctor	Confidence	Tobacco	
Midwife	Priority		
Gynaecology	Barrier		
Obstetrics	Attitude		
Clinician	Skill		
Dentist	Ability		
Pharmacist			
Consultant			

Note: all search terms were "exploded", meaning the terms underneath these keywords were also searched for.

Supplementary Table 2: Characteristics of included quantitative (N=54) studies

First Author (year) Country	Study Focus	Population & Risk Category (high/low)	Study Aim(s)	Ask	Advise	Assess	Assist	Arrange follow up	NRT	Summary of results
Abatemarco (2007) USA	Health Providers (Midwives)	Low risk	Determine how New Jersey's certified nurse-midwives (CNMs) provide tobacco screening and cessation counselling to pregnant smoking women.	X	X	X	X	X		Nearly all midwives routinely ask, advise, and assess; while fewer address quit dates, or discuss medication options (assist) and perform follow-up activities (arrange). Midwives identify a need for training.
Amarin (2005) Jordon	Health Providers (Obstetrician & Gynaecologists)	Low risk	Establish tobacco use amongst obstetricians/gynaecologists and assess awareness of the impact of smoking on health; routine practices with patients who smoke; opinions of factors contributing to tobacco use and their perceived barriers to counselling improvements.	X	X		X			A high proportion of obstetricians/gynaecologists are smokers. Most health professionals associated smoking with low birth weight and sudden infant death syndrome. Fewer associated smoking with infertility, ectopic pregnancy, placenta praevia, abruption placentae and cancer of the uterine cervix. Friends, stress, parents' attitude, genetic predisposition, income and education were implicated factors for smoking. Current smokers were more likely to permit smoking in their practices. Non-smokers were most inclined to record their patients' tobacco habits. Only 54.3% provided cessation counselling. Lack of time and inadequate training were perceived barriers.
Bakker (2005) Netherlands	Pregnant Women	Low risk	To identify relevant factors that hamper or promote the provision of effective smoking cessation advice and counselling.			NA*				In general, midwives were motivated to provide their clients with smoking cessation advice, however, were less comfortable guiding women through the cessation process.
Bar-Zeev (2017) Australia	Health Providers (GPs & Obstetricians)	Low risk	Examine: 1) Self-reported provision of SCC to pregnant women by GPs and Obstetricians in Australia; 2) Barriers and enablers to SCC and 3) Associations between	X	X	X	X	X	X	Almost all clinicians (98%) reported that addressing smoking during pregnancy is a high priority, and that they feel comfortable raising the issue with a pregnant woman (95%). TDF statements receiving the lowest agreement(agree & strongly agree) were having sufficient time (41%), sufficient resources (47.5%) and optimism of intervention effectiveness (35%). Dimension reduction revealed two factors: 1) 'Internal influences' including confidence in counselling, confidence in prescribing NRT, optimism, sufficient time and resources; 2) 'External influences' including high priority, benefit relationship,

			health professionals (GP/Obstetrician), knowledge, attitudes, and performance of SCC."						workplace routine, and comfortable raising the issue. Compared to NFASTIH GPs, being an Obstetrician was associated with lower performance of all the 5A's, but with a higher performance of AAR. No difference was found between the performance of the RANZCOG GPs and Obstetricians. 'Internal influences' were associated with a higher performance of all the 5A's, whereas 'External influences' were associated with a higher performance of AAR. Performing all the required 5A's was done by less than 20% of participants and was associated with barriers that are internal such as low confidence and low optimism. Internal barriers includes confidence in counselling, confidence in prescribing NRT, optimism in intervention effectiveness, sufficient time and resources. External barriers includes high priority, benefit relationship, workplace routine, comfortable raising the issue.
Beenstock (2012) UK	Health Providers (Midwives)	Low risk	Investigate the perceived implementation difficulties of midwives in providing smoking-cessation advice to pregnant smoking women. Investigate relationships between the self-reported behaviour of referring women to smoking-cessation services and demographic and professional variables.			NA*			Midwives were less certain about the consequences of, and the environmental context and resources available for, engaging in this work relative to other TDF domains. The 'propensity to act' was predictive of the self-reported behaviour 'Refer all women who smoke.....to NHS Stop Smoking Services' and mediated the relationship between demographic variables (e.g., midwives' workplace and behaviours). This study supports previous research that the TDF is an appropriate tool to understand the behaviour of healthcare professionals.
Berruetas (2016) Argentina & Uruguay	Pregnant Women	High Risk-Economic-ally deprived	Assess smoking patterns and receipt of 5A's among pregnant women in Buenos Aires, Argentina and Montevideo, Uruguay.	X	X	X	X	X	Among pregnant smokers in Argentina, 23.8% reported that a provider asked them about smoking at more than one prenatal care visit; 18.5% were advised to quit; 5.3% were assessed for readiness to quit, 4.7% were provided assistance, and 0.7% reported follow-up was arranged. In Uruguay, those percentages were 36.3%, 27.9%, 5.4%, 5.6%, and 0.2%, respectively.
Bonollo (2002) USA	Health Providers (Physicians, Nurses, Practitioner, & Nutritionists)	Low risk	To examine in detail the specific content and levels of knowledge among providers caring for low-income pregnant and postpartum women to present a current perspective on counselling related to tobacco addition. Explore provider characteristics related to knowledge levels.			NA*			Providers reported low awareness of the health risks of smoking to the developing foetus/child of pregnant and postpartum women and of the effectiveness of nicotine replacement therapy (NRT) for doubling quit rates. Obstetric (OB) and WIC providers were more aware than PED providers that provider-delivered interventions are effective. Confidence in using counselling steps was significantly associated with general and NRT-related knowledge. NRT-related knowledge, but not general knowledge, was associated with higher performance of intervention steps. Educational programs targeting OB, WIC, and PED providers' knowledge about effective smoking cessation counselling strategies and their confidence in being effective with patients are needed.
Bull (2006) UK	Health Providers (Health Visitors, Midwives, And Nurses)	Low risk	To examine the attitudes, knowledge and practice of health visitors, midwives and practice nurses in relation to smoking cessation interventions with	X	X	X	X	X	All health practitioners claimed to ask if their patients smoked. Most claimed to record smoking status on health records and give cessation advice. Fewer provided advice to partners of women in their care and only a minority had read the NICE clinical guidelines on NRT.

			pregnant women and new parents.							
Castrucci (2006) USA	Pregnant Women	Low risk	Describe the range of risk reduction behaviours among women who continue to smoke after learning of their pregnancy, including reduce tobacco use, eventual cessation and sustained abstinence as well the patient-reported smoking cessation - promoting behaviours of prenatal care providers.				X	X		Smoking cessation was achieved by only a quarter of antenatal smokers, almost 90 percent reduced their cigarette consumption. Antenatal smokers reported that prenatal care providers asked about their smoking (90.6%) and advised about quitting (76.5%). However, only 27.9% were given referrals to smoking cessation programs.
Chang (2008) USA	Pregnant Women & Health Providers (Obstetrics-Gynaecology Resident, Nurse Midwife, & Nurse Practitioner)	Low risk	Examine patient-provider communication about substance use behaviours during obstetric visits.	X	X	X	X	X		Provider responses to smoking disclosures included discussions of risks, encouragement to quit-cut down, affirmation of attempts to quit-cut down, and referral to smoking cessation programs. Providers should discuss behavioural change strategies and motivations with pregnant patients who use substances.
Chang (2013) USA	Health Providers (Nurse Midwife, Nurse Practitioner, Residents, Physician Assistant)	Low risk	Describe obstetric providers' adherence to the evidence-based clinical practice guideline for smoking cessation counselling, the 5 A's (Ask, Advice, Assess, Assist, and Arrange).	X	X	X	X	X	X	Obstetric providers frequently asked about smoking (98%) however, used 3 or more of the 5 A's in only 21% (24) of visits. In no visits did providers use all 5 A's.
Clasper (1995) UK	Health Providers (Hospital Midwives, Community Midwives, General Practitioners, Obstetricians)	Low risk	To inform the development of future smoking cessation interventions in pregnancy by measuring current practice and the associated attitudes and beliefs of the main professionals responsible for the delivery of antenatal care.	X	X		X	X		Most professionals asked about the smoking status of pregnant women, record smoking status and explain the risks of smoking while pregnant. Fewer professionals gave pregnant smokers advice on how to stop or monitored at and reviewed smoking status throughout pregnancy. Most experienced difficulty and a lack of enjoyment while giving smoking cessation counselling. Over half (53%) perceived themselves to be insufficiently trained, whilst few (28%) thought that they possessed the necessary skills.
Coleman-Cowger (2014) USA	Health Providers (Obstetrician & Gynaecologists)	Low risk	To assess current ob-gyn practice patterns related to the management of and barriers to smoking	X	X	X	X	X	X	Ob-gyns estimated that approximated that 32% of pregnant smokers quit during pregnancy, but 50% return to smoking postpartum. The primary barrier was time limitations. Compared with findings from a similar study conducted in 1998, physicians are less likely to adhere to the 5 As smoking cessation guideline at present.

			cessation during pregnancy and postpartum.						
Condliffe (2005) USA	Health Providers (Midwives Grandes E-H, Health Care Assistants)	Low risk	Explore the self-reported smoking-cessation interventions of maternity staff with pregnant smokers and their attitudes towards smoking in pregnancy.		X	X		X	Over two-thirds of respondents (71%) reported not advising any pregnant women to give up smoking within the previous 7 days. However, 64% felt women should not make up their own minds about whether to smoke during pregnancy, and 81% agreed/strongly agreed that many pregnant women would like to give up smoking but need help and advice on how to succeed. Helping a pregnant woman to give up smoking was seen as being one of the most important things a midwife can do by 73% of the respondents. Although the reported attitudes were supportive of the midwife's role in smoking cessation, they did not translate into practice. The level of smoking cessation interventions was low.
Cooke (1996) Australia	Health Providers (Midwives)	Low risk	Assess current practice in smoking cessation interventions by midwives and to examine the relationship between the use of smoking interventions, practitioner's characteristics, and organisational factors.	X	X		X	X	Most midwives used minimal interventions (advice and education) for at least some of their clients. The more skilled and more time-intensive forms of intervention (e.g., counselling, negotiating a quit date, and follow-up) were infrequently utilized. Participants estimated that half their smoking clients were not offered advice about smoking. Organizational factors such as: hospital policy for smoking intervention, type of hospital, size of hospital, cohesion of staff and work pressure predicted the use of smoking interventions. Self-reported ability to intervene for smoking and the level of assessment undertaken were practitioner characteristics which predicted the use of smoking interventions. The barriers that inhibit the use of smoking intervention by midwives are discussed and methods for change canvassed.
Cooke (1998) Australia	Health Providers (Midwives, Doctors: Obstetric Specialists, Registrars and Residents)	Low risk	The aims of the study were to describe the smoking intervention practice of antenatal clinic staff, and to ascertain the organizational and practitioner variables which predict clinician use of smoking interventions.	X	X		X	X	Most antenatal clinic staff did not use the most effective forms of brief interventions for smoking. The presence of specific procedures and training in smoking cessation intervention appeared to be the most important predictors of reported smoking intervention in hospital antenatal clinics.
Eiser (1999) UK	Health Providers (Midwives)	Low risk	Assess a) their attitudes to giving anti-smoking advice to pregnant smokers and whether they perceived this as part of their professional role and b) the types of advice they gave to pregnant smokers as part of their routine practices.	X	X	X	X		Midwives attitudes towards giving anti-smoking advice were generally positive, and almost all reported routinely explaining the health dangers of smoking to pregnant smokers. Among midwives who had never smoked, those who held role attitudes that were more favourable towards anti-smoking intervention reported providing relatively more advice based on warnings of health consequences and an emphasis on abstinence. Among the remainder of the sample, more favourable attitudes predicted greater use of behaviourally-oriented advice to facilitate cessation or smoking reduction, but were unrelated to the use of health warnings and emphasis on abstinence.
England (2014) USA	Health Providers (Obstetrician-Gynaecologist Physicians)	Low risk	Examine screening practices and attitudes of obstetricians-gynaecologists toward new and emerging tobacco products.			NA*			A substantial proportion of obstetrician-gynaecologists reported never or inconsistently screening their pregnant patients for the use of non-combustible tobacco products. Responses regarding the harms of these products relative to cigarettes were mixed and most respondents wanted more information.

Floyd (2001) USA	Health Providers (Obstetric-Gynaecologists)	Low risk	Assess the knowledge, beliefs and practice behaviours of obstetricians/ gynaecologists concerning their patients prenatal use of tobacco and other drugs.	X	X		X	X	X	While screening of prenatal patients for tobacco use and other drug use was reported by survey respondents, providing or arranging for interventions for those screening positives was less often reported.
Glover (2008) NZ	Health Providers (GPs, Registered Midwives)	Low risk	To examine New Zealand general practitioners' GP and midwives' smoking cessation knowledge and support offered to pregnant women who smoke.	X	X	X	X	X	X	GPs are in the ideal position to offer stop-smoking advice, because they usually confirm pregnancy. GPs are most likely to advocate stopping smoking completely; midwives are more likely to advocate cutting down with a view to quitting. Both GPs and midwives would benefit from improved knowledge of the full range of nicotine replacement therapy (NRT).
Grange (2006) France	Pregnant Women	Low risk	To describe the management of tobacco withdrawal in pregnant women.	X	X	X	X			Healthcare professionals seems to offer only rudimentary care. Simple strategies to help women give up smoking are required. The partner is an important target, especially if he can be persuaded to give up at the same time.
Grimley (2001) USA	Health Providers (Obstetrician & Gynaecologists)	Low risk	To determine the adherence to the clinical guidelines for smoking cessation among Ob-gyn physicians within Alabama.	X	X	X	X	X	X	Interventions are needed to motivate, support, and guide OB-GYN physicians to assist and follow-up with their pregnant patients who smoke.
Hartmann (2007) USA	Health Providers (Obstetricians, Midwives, Family Medicine Physicians, Nurse Practitioners and Physician Assistants)	Low risk	To measure the use of best practice intervention including each of the 5 A's and to assess the relationship between best practice and current intervention resources, prior training in smoking cessation intervention and barriers to providing intervention.	X	X	X	X	X	X	Best practice is well-established to promote prenatal smoking cessation yet implemented by only one third of prenatal care providers in North Carolina. In this study, best practice was associated with resources, practice organization, and reimbursement. Augmented use of available resources (e.g., toll-free hot-lines) and adequate reimbursement may promote best practice implementation.
Helwig (1998) USA	Health Providers (Obstetricians, Family Physicians, Midwives)	Low risk	Investigate the usual intervention practices of family physicians, obstetricians, and nurse midwives for their patients who smoke.	X			X	X	X	Maternity care providers underutilize effective methods of smoking cessation for their patients who smoke and rely on less effective methods.
Herbert (2005) UK	Health Providers (GPs)	Low risk	Determine a). General practitioners' confidence in their ability to deliver a range of smoking cessation interventions, including NRT in pregnancy, b). the frequency with which general practitioners recall prescribing NRT in		X			X	X	Most general practitioners (62%) believed NRT to be effective in pregnancy and safer than smoking (70%), but fewer (45%) believed NRT to be safe in pregnancy. GPs who believed NRT use in pregnancy was safer than smoking were most likely to recall having prescribed it. Many general practitioners were unsure about the safety of NRT in pregnancy. The key factor influencing general practitioners' prescribing decisions was a belief that NRT use in pregnancy was likely to be safer than smoking.

			pregnancy and c). The factors that influence general practitioners to prescribe NRT in pregnancy.						
Hickner (1990) USA	Health Providers (Family Physicians)	Low risk	Reports practitioner's attitudes and strategies towards antismoking interventions for pregnant smokers.	X	X	X	X	X	Most physicians routinely assessed smoking status at the first prenatal visit, and advised pregnant smokers to quit smoking during pregnancy. The most frequently used method of intervention was personal counselling (97%), referral to smoking cessation clinics (40%), and behaviour modification (20%). Fifty-seven percent of physicians reported using antismoking pamphlets, and 30% used antismoking posters. 97% were convinced that the benefits of smoking cessation during pregnancy merited their efforts.
Hoekzema (2014) Australia	Pregnant Women	Low risk	To characterise pregnant smokers and to understand their smoking behaviours and preferences for smoking cessation. The specific objectives were to study the smoking patterns, smoking cessation and treatment preferences of pregnant women and to investigate the scope for a smoking cessation program in the antenatal settings.		X	X		X	There were 87 (69.6%) daily smokers and 38 (30.4%) occasional smokers. Smokers mainly had medium (54; 43.2%) or heavy nicotine dependence (45; 36%). Current smokers were younger, Australian born, not living with a partner, from a lower socio-economic background, multigravida and had a smoker in their household or among friends. Although pregnant smokers were aware of the possible complications of smoking, their motivation and confidence to quit (median) on a 10-point scale were 7 and 4, respectively. Most smokers preferred to stop smoking gradually (74; 71.2%). The preferred methods for quitting were medications (49; 47.6%) and hypnotherapy (35; 34.0%). Patches (28; 29.5%) were the preferred dosage form, and nicotine replacement therapy (25; 28.1%) was the preferred medication. Less than half reported that their health professionals discouraged smoking during pregnancy.
Howard (2013) UK	Pregnant Women	High risk – women with mental illness	Investigate whether pregnant women with mental disorders: a). Are less likely to accept referrals to smoking cessation services, b) are less likely to stop smoking by delivery, and c). Differ in their experiences of smoking, smoking cessation and smoking cessation services compared with pregnant women without mental disorders.			X	X		Pregnant women with mental disorders appear more motivated, yet find it more difficult, to stop smoking. Prioritisation of mental health over smoking may thus lead to increasing health inequality for this group.
Jones (2003) UK	Pregnant Women & Health Providers (Midwives)	Low risk	Explore the attitudes of midwives and pregnant women towards smoking cessation advice to understand why it is not a routine part of antenatal care.		X	X			Only 45% of midwives offered smoking cessation advice routinely, although 82% felt it should be a part of the antenatal care (82%). Lack of time (66%) and training (54%) were the major reasons for this. Smoking cessation advice was not a priority for discussion among the midwives compared to topics such as antenatal screening or place of delivery. Women were aware of the dangers of smoking in pregnancy, but those who wanted to quit need more support from their midwives (83%). They ranked smoking cessation as a

										high priority for discussion at the antenatal visit. The midwives did not feel able to offer smoking cessation advice. The main reason being a of lack of time in the antenatal clinic.
Jordan (2006) USA	Health Providers (Obstetricians, Gynaecologist)	Low risk	To assess Ohio obstetrician/gynaecologists' perceptions and use of the 5A's methods of smoking cessation with pregnant patients who smoking.	X	X	X	X	X	X	Obstetrician/gynaecologists face many competing demands for their time and energy, yet 62% believed smoking cessation advice would be of significant value. Physicians with higher levels of efficacy expectations reported significantly greater use of the 5 As. Future research should explore ways to facilitate obstetrician/gynaecologists' use of the 5As method.
Lemola (2012) Switzerland	Health Providers (Gynaecologists, Midwives)	Low risk	Examined whether gynaecologists and midwives engage in screening and counselling of pregnant women and conducting interventions to prevent smoking during pregnancy. Examine control beliefs involving efficacy expectations of practitioner.	X	X		X			Most gynaecologists and midwives reported screening all pregnant patients regarding smoking, explaining the risks and recommending smoking cessation. By contrast, only a minority engages in more extensive prevention efforts. Strong control beliefs were predictive of a higher likelihood of screening and counselling, as well as of engaging in more extensive interventions.
Mabbutt (2002) Australia	Pregnant Women	Low risk	To examine substance use among pregnant women and their partners, to record changes in reported substance use during pregnancy and to determine what advice they received to stop smoking.		X					Routine advice to quit smoking was not the norm for this group who were motivated to attend antenatal classes and possibly more likely to act on quit smoking advice. Of the women and men who did receive advice to quit smoking, the majority of this advice was not from a health professional. Routine advice about quitting smoking should be a mandatory part of antenatal care, especially for disadvantaged groups, where smoking rates are higher. The antenatal setting accesses most pregnant women and provides a population base for comprehensive anti-smoking strategies for them and for their partners. Failure to implement such strategies would be to miss the opportunity for a cost-effective and disseminable public health intervention for pregnant women and their male partners.
McEwen (2003) UK	Health Providers (GPs)	Low risk	Investigate methods of early referral of pregnant smokers.	X				X		From a total of 55 GPs, in 17 practices within a deprived area of South West London, according to predictions from the delivery figures for the previous year, approximately 120 pregnant smokers should be identified within the 9-month period that the study took place. GPs were invited to use whatever form of referral was most convenient to them. Only 8 referrals were received.
Mejia (2010) Argentina and Uruguay	HEALTH PROVIDERS (Obstetricians, Gynaecologists, & Residents)	Low risk	To describe physicians' practices of smoking cessation and second-hand smoke exposure counselling during prenatal visits.	X	X				X	Although 88.9% of practitioners always or almost always advised women to stop smoking, 75% believed it was acceptable for pregnant women to smoke up to 6 cigarettes per day. The risk of SHS exposure was 'always or almost always discussed' by only 34.5% of physicians. Multivariate logistic regression showed that lack of training was associated with less counselling about smoking cessation (OR 0.18; 95% CI 0.04-0.82) and SHS exposure (OR 0.27; 95% CI 0.12-0.59). Current compared to never smokers had lower odds of smoking cessation counselling (OR 0.39; 95% CI 0.05-0.82). Current smokers were less likely than former smokers to counsel about SHS (OR 0.25; 95% CI 0.11-0.62).
Moran (2003) USA	Health Providers (Family Practitioner,	Low risk	To assess how frequently physicians identified the smoking status of pregnant				X			Physicians identified pregnant women's smoking status at 81% of visits but provided smoking counselling at only 23% of visits by pregnant smokers. Physicians were less

	General Practitioner, Obstetrician, & Gynaecologist)		patients and how frequently physicians counselled pregnant smokers.						likely to identify smoking status of non-White pregnant women but no less likely to counsel non-White smokers.
Mullen (1998) USA	Health Providers (Obstetricians)	Low risk	To describe Texas obstetricians' pregnancy smoking cessation counselling activity and to identify attributes associated with consistent, effective counselling.	X			X	X	X	Obstetricians who are not reached by expert reports and guidelines from groups outside their specialty or who do not perceive the seriousness of maternal smoking are less likely to counsel consistently and to use the most effective techniques.
Murphy (2016) South Africa	Health Providers (Midwifes)	Low risk	to assess the knowledge, attitudes, beliefs and current practices of South Africa midwives in relation to providing smoking cessation education or counselling to pregnant women.	X	X					This study identified several constraints to midwives fulfilling this role, which affected their perceived behavioural control. These included stressful working conditions, too little time, a dearth of educational resources and a lack of knowledge of best practice intervention methods and counselling skills. Perceived patient resistance to quitting was a further obstacle.
Oncken (2000) USA	Health Providers (Obstetrics & Paediatric)	Low risk	To assess smoking cessation counselling and nicotine replacement therapy prescription and recommendation practices among obstetric and paediatric providers.		X				X	We found that nicotine replacement therapies are commonly prescribed or recommended to pregnant smokers by obstetric providers, but less commonly to lactating women by paediatric providers.
Owen (1999) UK	Pregnant Women	Low risk	Examines pregnant women's reports of quality and quantity of health professional interventions from 1992 – 1999.		X					Less than 50% of pregnant smokers reported having received advice on smoking from a health professional during their current pregnancy: little change since the question was first asked in 1994. Advice, when given, appeared to have had little impact on smoking cessation, and did not follow best available evidence, namely to quit rather than cut down.
Passey (2012) Australia	Health Providers (AHW, Midwives or Nurses, Doctors)	High Risk- women Aboriginal and Torres Strait Islander	Aims to explore the knowledge and attitudes of health care providers caring for pregnant Australian Aboriginal women regarding smoking risk and cessation and identify factors associate with self-reported assessment of smoking. Optimal and assessment of smoking status.	X					X	Most respondents considered assessment of smoking status to be integral to antenatal care and a professional responsibility. Most (79%) indicated that they assess smoking status in 100% of clients. Knowledge of risks was generally good, but knowledge of cessation was poor. Factors independently associated with assessing smoking status among all women were: employer service type ($p = 0.025$); cessation knowledge score ($p = 0.011$); and disagreeing with the statement that giving advice is not worth it given the low level of success ($p = 0.011$).

Passey (2015) Australia	Pregnant Women	High Risk-women Aboriginal and Torres Strait Islander	Provision of antenatal smoking cessation support: A survey with pregnant Aboriginal and Torres Strait Islander women.	X	X		X			Despite most pregnant women who smoke reporting advice and support to quit, the persisting high prevalence of smoking suggests that this support is insufficient to overcome the many factors pushing women to smoke.
Passey (2014) Australia	Health Providers (AHW, Midwives or Nurses, Doctors)	High Risk-women High risk: Aboriginal and Torres Strait Islander	Supporting pregnant Aboriginal and Torres Strait Islander women to quit smoking: views of antenatal care providers and pregnant indigenous women.			NA*				Current smokers (n = 121) were less positive about the potential effectiveness of most of the 12 strategies than the providers (n = 127). For example, family support was considered helpful by 64 % of smokers and 91 % of providers; between 56 and 62 % of smokers considered advice and support from midwives, doctors or Aboriginal Health Workers likely to be helpful, compared to 85-90 % of providers. Rewards for quitting were considered helpful by 63 % of smokers and 56 % of providers, with smokers rating them more highly and providers rating them lower, than most other strategies. Quitline was least popular for both.
Price (2006) USA	Health Providers (Nurse-Midwives)	Low risk	Perceptions and Use of Smoking Cessation in Nurse-Midwives' Practice.	X	X	X	X	X	X	Few nurse-midwives identified barriers to counselling pregnant patients who smoked, but the most common were lack of time (14%) and not knowing where to send pregnant smokers for treatment (14%). Most respondents believed that nicotine replacement therapy (NRT) would be most likely to reduce the number of pregnant smokers (74%), yet few (26%) were confident in their ability to prescribe/recommend nicotine replacement therapy. Respondents more likely to use 5 A's can be characterized as the following: had higher efficacy expectations in their ability to communicate issues about the 5 A's and had higher outcome expectations regarding the effects of using the 5 A's.
Price (2006) USA	Health Providers (Obstetricians, Gynaecologists)	Low risk	Obstetricians and gynaecologists' perceptions and use of nicotine replacement therapy.	X	X	X	X	X	X	The majority did not prescribe NRT possibly because few respondents received cigarette smoking cessation training in medical school or their residencies. Significant revisions in professional training and more continuing medical education are needed regarding smoking cessation and use of NRT.
Pullon (2004) NZ	Health Providers (GPs Practicing Obstetrics, Midwives)	Low risk	Smoking cessation and nicotine replacement therapy in current primary maternity care.	X	X				X	Only about half of the health professional gave smoking cessation advice to most pregnant women who smoked. They were uncertain about the safety of NRT use in pregnant and breastfeeding women. Most respondents requested more information about NRT use.
Roske (2009) Germany	Health Providers (Midwives, Gynaecologists, Paediatrician)	Low risk	Smoking cessation counselling for pregnant and postpartum women among midwives, gynaecologists and paediatricians in Germany.	X	X		X			Depending on profession, 90 % to 100 % see smoking cessation counselling as their assignment, 17 % to 80 % screen for, 48 % to 90 % document smoking status, and 55 % to 76 % offer brief or extensive counselling. 61 % to 87 % consider training to enhance their knowledge and/or counselling skills necessary. The compliance of providers with the necessity to give support in smoking cessation is very high. However, the status of cessation counselling does not sufficiently correspond to the evidence based requirements.
Solberg (2010) USA	Pregnant Women	Low risk	Disparities in tobacco cessation medication orders and fills among special populations.				X		X	32,733 current users of tobacco, 18,047 of whom had both health insurance and pharmacy claims data available. After adjustment, 15.4% overall had received an order for cessation medications during this year, but only 78% had filled it. Groups receiving fewer orders than their comparison groups were aged 18-34 years or older than 65 years, men, pregnant women, Asians and Hispanics, and those with non-English-language preference, on Medicaid, or with fewer visits. The same groups were less likely to fill that prescription, except patients with non-English preference or Medicaid. There are disparities in both the receipt of cessation medication orders and the likelihood of filling them for some special

									populations. The causes are likely to be complex, but this information provides a starting point for learning to improve this problem.
Tappin (2010) UK	NA	Low risk	To establish a denominator for pregnant smokers in Scotland and describe the proportion who are referred to specialist services, engage in one-to-one counselling, set a quit date and quit 4 weeks later.	X			X		Poor smoking cessation outcomes are a product of current limitations to identification, referral, engagement and treatment. Carbon monoxide breath testing can bypass this difficulty of patient providing faulty information.
Thyrian (2006) Germany	Health Providers (Midwives)	Low risk	To establish a denominator for pregnant smokers in Scotland and describe the proportion who are referred to specialist services, engage in one-to-one counselling, set a quit date and quit 4 weeks later.	X	X		X			Smoking and exposure to environmental tobacco smoke are seen as prominent health threats that midwives reported they addressed routinely, including giving advice to stop smoking.
Tong (2008) USA	Pregnant Women	Low risk	Investigate the attitudes of midwives to counselling women about their smoking behaviour during pregnancy and post-partum.					X	Almost all women reported that their prenatal care provider asked if they smoked, but only 56.7% reported that a provider counselled them to quit smoking. Only 11.5% of women who smoked in late pregnancy used a cessation method, including self-help materials (6.3%); medications (3.9%); face-to-face counselling (1.7%); telephone-based counselling (1.5%); Internet-based counselling (1.3%); and a class or program (1.0%).
Tran (2010) USA	Pregnant Women	Low risk	To explore racial/ethnic disparities in the receipt of optimal smoking cessation counselling during prenatal care.	X	X		X			Of 594 first trimester pregnant smokers, the majority were asked and advised about smoking by a prenatal care provider. However, a substantial proportion of women did not receive assistance to quit and only 42.2% received all three steps. Significant racial/ethnic variations were found only in the Assist step. Compared to non-Hispanic (NH) White women, NH American Indian women had lower odds of receiving all three steps. In contrast, NH Black women had increased odds of receiving all three steps. We conclude that there is a need for prenatal care providers to address tobacco use, especially to Assist quitting, with all pregnant smokers.
Tzelepis (2017) Australia	Health Providers (AHW or Aboriginal Health Education Officers, Child Health Nurses, & Midwives)	High Risk-women Aboriginal	To examine Aboriginal antenatal and postnatal staff confidence, perceived role and delivery of smoking cessation care to Aboriginal women and characteristics associated with provision of such care.	X			X	X	X	Most staff reported they assessed clients' smoking status most or all of the time (92.2%). However, only a minority reported they offered a Quitline referral (42.2%), provided follow-up support (28.6%) or provided nicotine replacement therapy (4.7%) to most or all clients who smoked. Few staff felt confident in motivating clients to quit smoking (19.7%) and advising clients about using nicotine replacement therapy (15.6%). Staff confident with talking to clients about how smoking affected their health had significantly higher odds of offering a Quitline referral and quitting assistance to clients who smoke.
Walsh (1995) Australia	Health Providers (Medical Directors & Nursing Directors)	Low risk	To assess the smoking cessation practices of Australian public antenatal clinics.		X		X	X		Smoking advice was rated an essential activity at the first antenatal visit by 69% of responding directors. Nonetheless, only 12% of clinics indicated they offered relevant training and 4% reported written policies. Results also indicate senior staff may have suboptimal levels of awareness of smoking risks. Clinics used a narrow array of strategies

										to promote cessation. Almost one-third of directors said they advised smokers to cut down rather than stop smoking completely.
Zapka (2000) USA	Health Providers (Physician, Nurse-Practitioner or Midwife, RN, Nutritionists, Nutrition Assistant)	Low risk	Assess providers' performance of smoking cessation counselling steps with low-income pregnant and postpartum women receiving care at community health centres.	X	X	X	X	X	X	Providers in obstetric clinics had the highest scores and those in paediatric clinics had the lowest scores. Nurse practitioners and nutritionists had higher scores than other providers. Clinic type, greater smoking-related knowledge, older age, and perception of smoking cessation as a priority were independently related to better counselling performance. Low scores for performance of steps beyond assessment and advice indicate a need for emphasis on the assistance and follow-up steps of national guidelines. Providers' own commitment to helping mothers stop smoking was important.

NA – Not applicable to study or not described

Supplementary Text 1: Grouping of outcome measures for the meta-analyses

For each outcome (Ask, Advice, Assess motivation to quit, Assess nicotine dependence, Assist, Arrange follow up, Arrange referral, NRT), we looked at the specific measurement that was done to decide whether it was feasible to group together. To achieve this we looked both at data collection method – cross-sectional survey/ audit of patients medical records/ audio-recording of consultation/ women's report through survey or interview; and also on the measure itself that was used – Likert scale/ dichotomous YES/NO question and so forth.

ASK – overall 38 manuscripts had data on ASK. Out of these 12 used a survey measure reflecting asking all of their patients. We included in this analysis the proportion answering always if a Likert scale was used, or the proportion answering Yes if a dichotomous question was used either asking if you ask all of your patients? Or if you ask your patients always? Answers reflecting asking more than 75% of their patients were also considered as Yes for this analysis. 9 other manuscript used a survey measure reflecting asking usually and always – this including the combined answers in Likert scales (always and usually; and/or most of the time and all of the time). Two manuscripts provided data for both these measures (Bar-Zeev et al and Mejia et al). 4 other manuscripts used women's report whether they recall been asked during their pregnancy.

Advice – The same principles as used in ASK (see above). Advice always included 6 manuscripts using either Likert scales or asking whether you always advise your patients to quit. Advice always and often included 9 manuscripts using either a scale of always and often; or always and usually; or advising all and most of women; or a Yes/No question whether you advice routinely (to more than 50% of patients). Since 8 manuscripts used a more general "Do you advise Yes/No" question, without referring to the amount of patients this is done with, these were grouped separately as Advice Yes/No. 4 other manuscripts used women's report whether they recall been advised to quit during their pregnancy.

Assess motivation to quit – 10 manuscripts in total included some aspect of assessing motivation to quit. 1 used audio-recordings. 2 manuscripts used a measure calculating the mean on a different scale (1-5 and 1-3). 1 used women report. 1 reported on % always only. 1 reported on % usually always. 3 manuscripts assessed willingness to quit in general (with no time point included in the question) and reported on the proportion that answered "always and usually " – these were included in the meta-analysis. One paper asked a similar question but defined this as "% always usually assess whether the patient is willing to make a quit attempt within the next 30 days". Since this included a specific time-point it was considered to be different to the other 3 and not included.

Assess nicotine dependence – Only 3 papers included a question on this topic. 1 reported on % always and often; 1 reported on % always; and 1 reported also on % always and often but asked a general question on # of cig. smoked and not specific to assessing nicotine dependence. It was decided not to run a meta-analysis on these as too different.

Assist – This included many different definitions of assist in quitting – some were general about assisting the patient to quit, and some included a more specific method of assisting such as counselling or setting a quit data.

Overall 34 different manuscripts included some kind of question on assisting. 4 manuscripts had data on women's report on whether they recalled been offered any support to quit – these were general such as "Did your doctor or other HCP ever tell you (at least in one visit) about things you could do to quit smoking?", recalled being offered assistance to quit by health providers; report that their provider offered suggestions for quitting, recall health providers offer support to quit smoking yes/no. 3 manuscripts reported on % reporting always and often helping their patients to set a specific quit data – this included a Likert scale of always and often, or arrange setting a quit data with at least 50% of their patients, or arranging this with most and all of their patients. Only 1 extra manuscript reported specifically on a quit date but included a general not specific Yes/No question - % reporting they negotiate a quit date with their patients – therefore this was not included in the meta-analysis. For "Assist-Often-Always-CessationSupport" the same principles as for ASK were applied here as well – 'always and often' was combined with 'always and usually', and with 'most and all of the patients' and with 'to at least 50% of the patients'. Included in this were any questions using this measurement of general counselling or providing support or assistance – total 5 papers. An additional 5 papers were used for the meta-analysis for Assist-Yes-Counselling – this included any general questions about counselling Yes/No, any general statement of proportion reporting counselling. For Roske note that in the paper they separated based on those reporting providing counselling over 10 minutes and those reported providing brief counselling (under 10 minutes) – the total proportion providing counselling Yes/No was calculated combining these two together. Assist always often quit plan – only 2 papers included a measure about a quit plan and/or specific steps needed

Gould GS, *et al. BMJ Open* 2019; 9:e026037. doi: 10.1136/bmjopen-2018-026037

to take to quit. Other papers included either other measures for these outcomes (for example a mean), or measured other assist such as assist by providing social support. These were different from each other so were not included in the meta-analysis.

Arrange follow up – Measures were different from each other so no meta-analysis was done. 2 manuscripts included a measure of always/often general follow up with no mention of a time point; 1 reported % following up on all of the patients; 1 measured % always following up but within a week; and 2 reported always/often within a week.

Arrange referral – Similar to the principles used for ASK (see above) – 6 papers measured % always/often referring - always and usually, always and often, all and most of patients. 3 papers measured always – we decided not to do a meta-analysis due to limits of # of meta-analysis, and these were only 3.

NRT – Same principles as for ASK regarding proportion reporting often/always prescribing NRT (4 papers) and proportion reporting always prescribing (4 papers). We also performed a meta-analysis on 6 papers that included a more general measurement of whether they prescribe or not – included in this were proportion reporting prescribing at least sometimes; proportion recalling prescribing NRT in pregnancy; proportion reporting using this method, proportion using this method currently.

Supplementary Forest Plot Figures 1-17

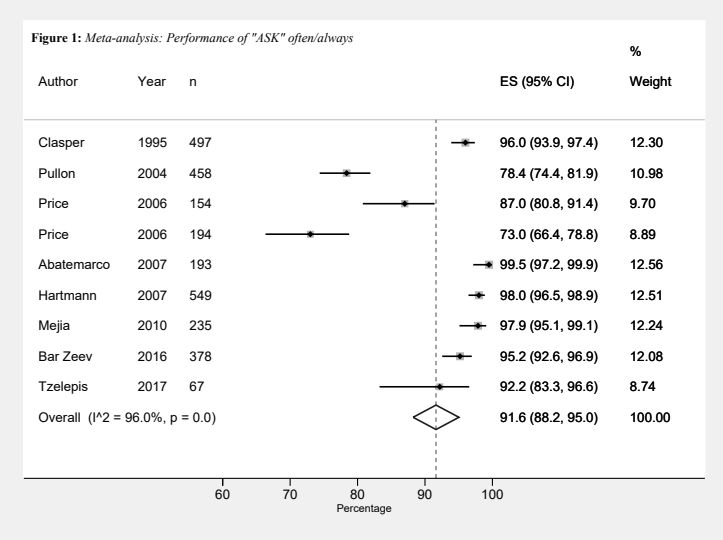


Figure 1: *Meta-analysis: Performance of "ASK" often/always*

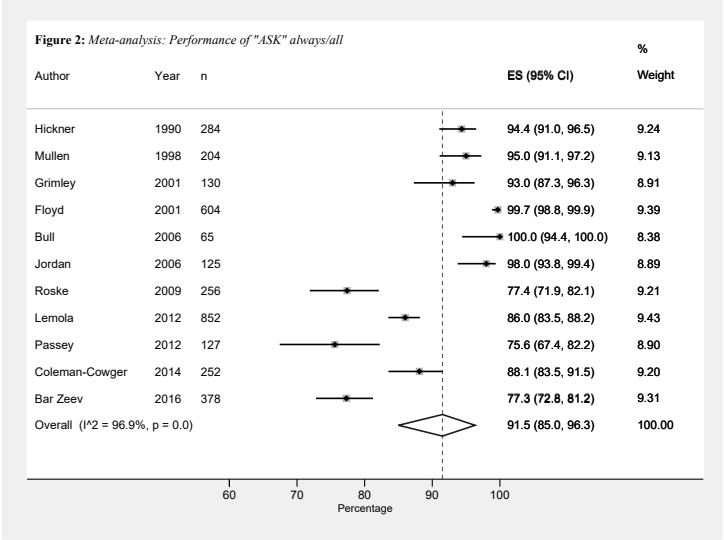


Figure 2: *Meta-analysis: Performance of "ASK" always/all*

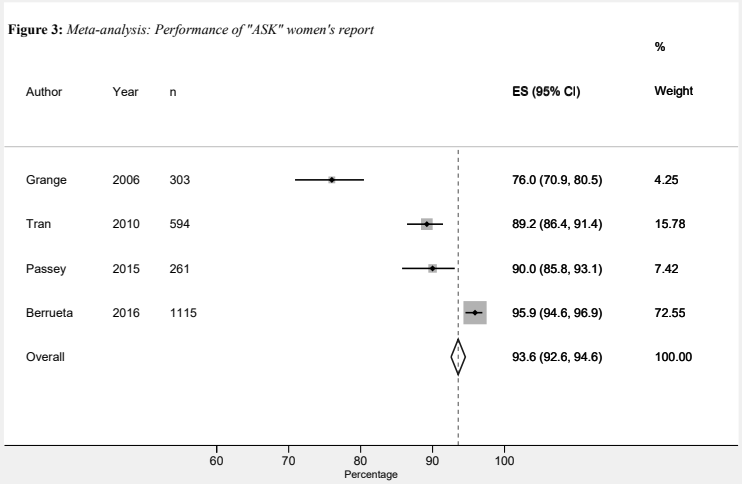


Figure 3: *Meta-analysis: Performance of "ASK" women's report*

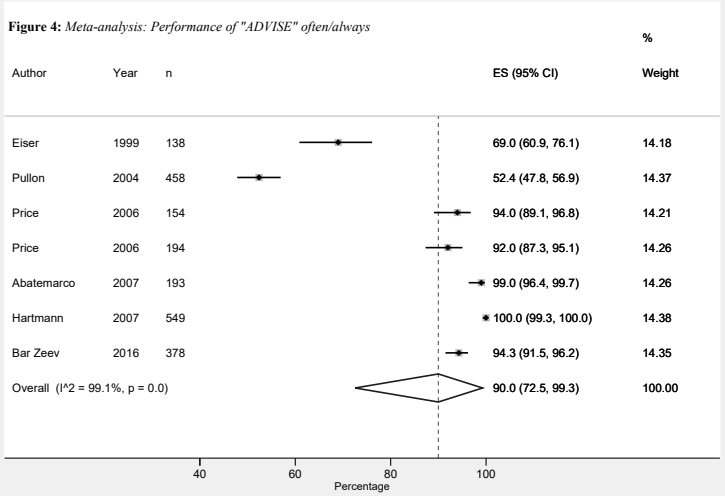


Figure 4: *Meta-analysis: Performance of "ADVISE" often/always*

Figure 5: *Meta-analysis: Performance of "ADVISE" always/all*

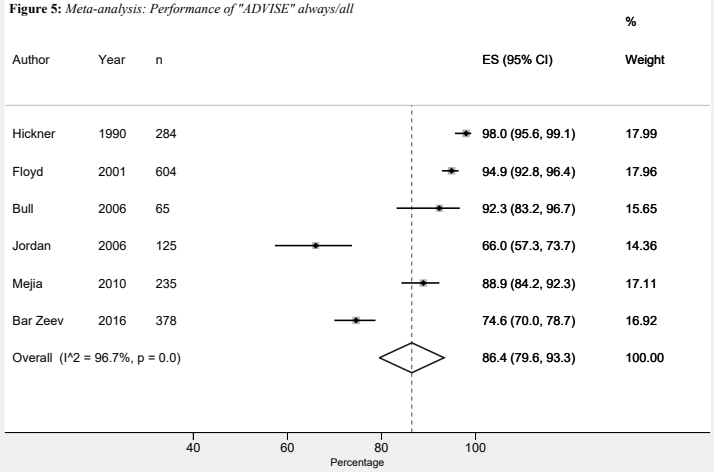


Figure 6: *Meta-analysis: Performance of "ADVISE" Yes*

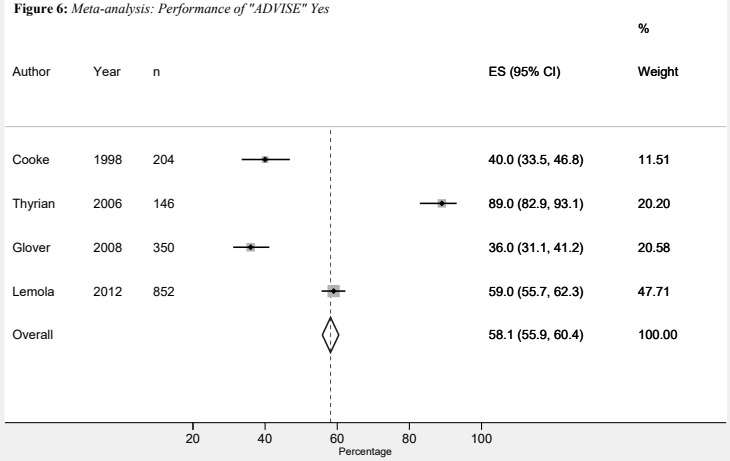


Figure 7: *Meta-analysis: Performance of "ADVISE" women's report*

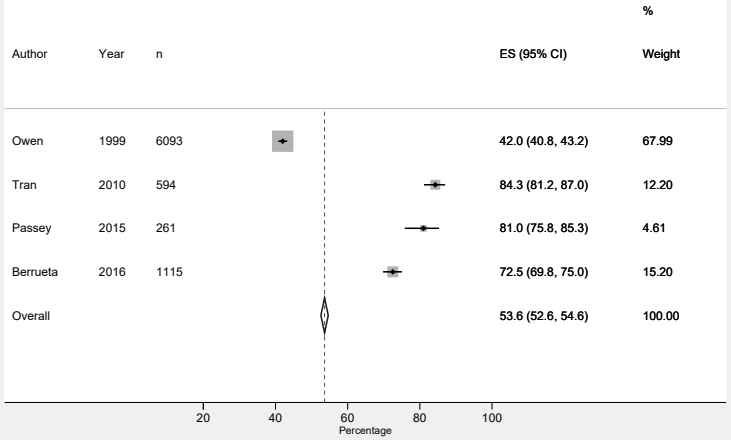


Figure 8: *Meta-analysis: Performance of "ASSESS" Motivation to quit often/always*

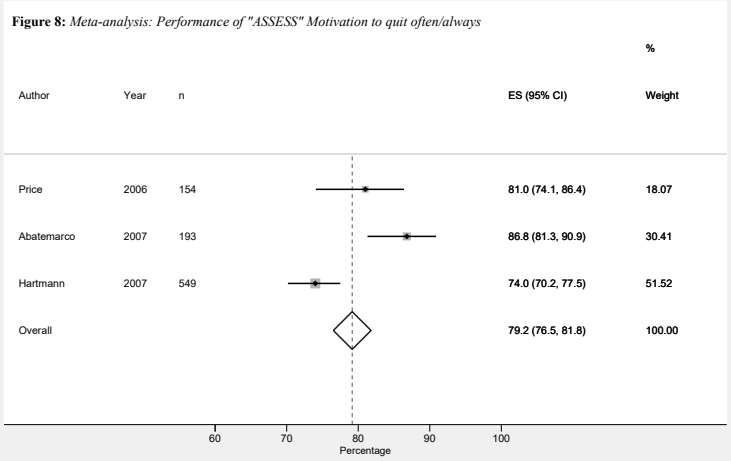


Figure 9: *Meta-analysis: Performance of "ASSIST" Cessation support often/always*

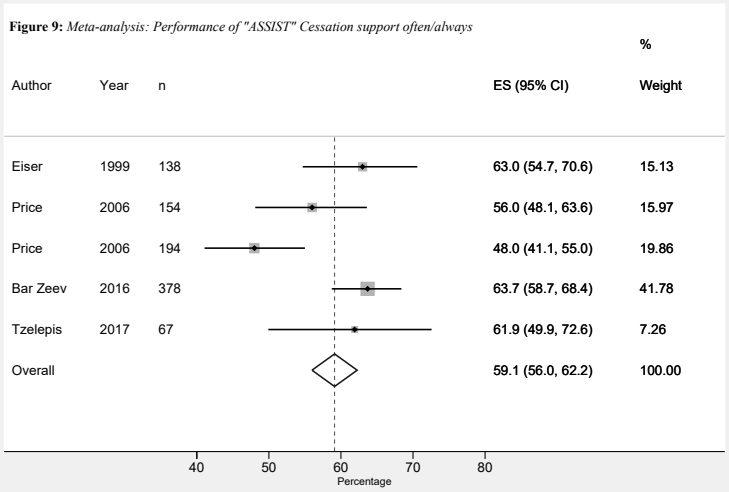


Figure 10: *Meta-analysis: Performance of "ASSIST" Counselling always/all*

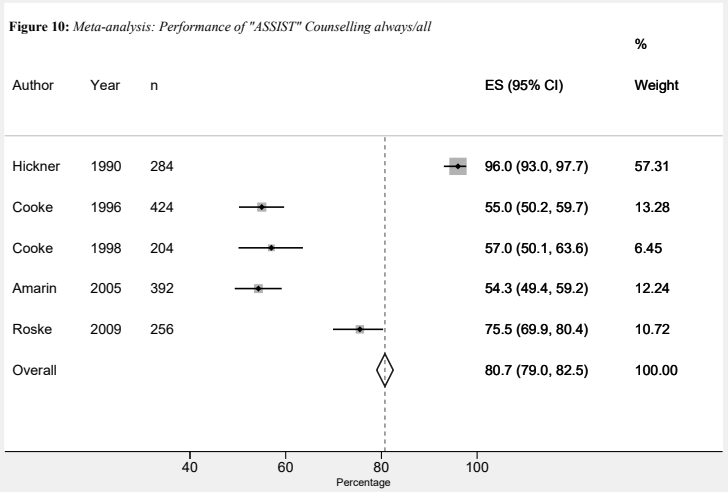


Figure 11: *Meta-analysis: Performance of "ASSIST" Quit date often/always*

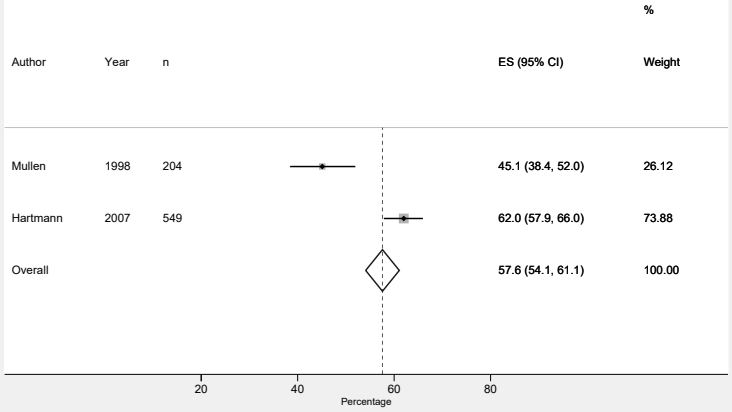


Figure 12: *Meta-analysis: Performance of "ASSIST" women's report*

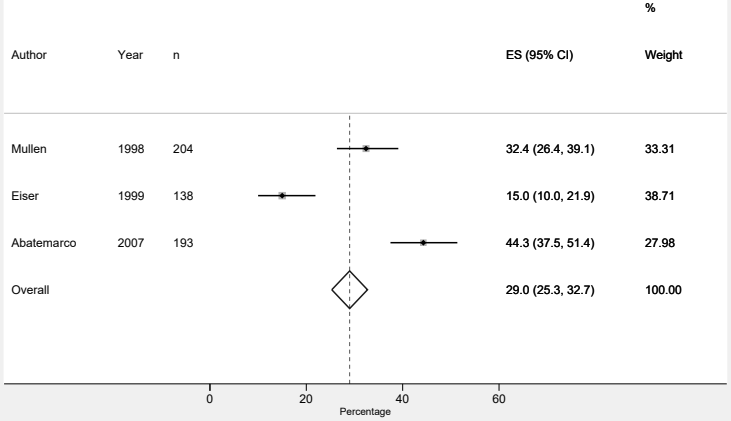


Figure 13: *Meta-analysis: Performance of "ASSIST" Quit plan often/always*

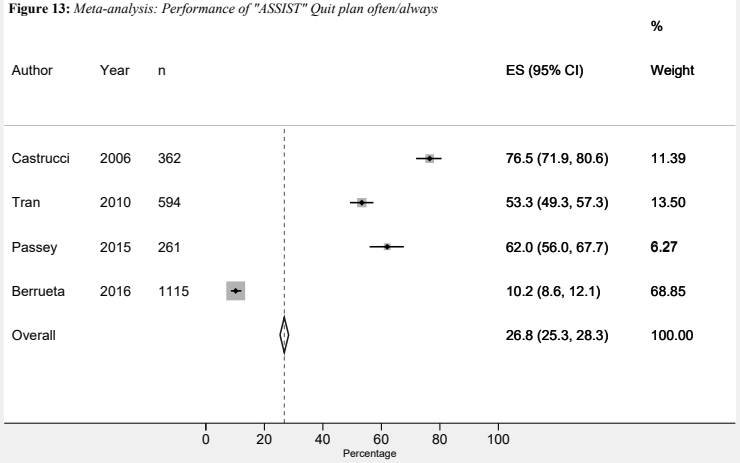


Figure 14: *Meta-analysis: Performance of "ARRANGE" Referral often/always*

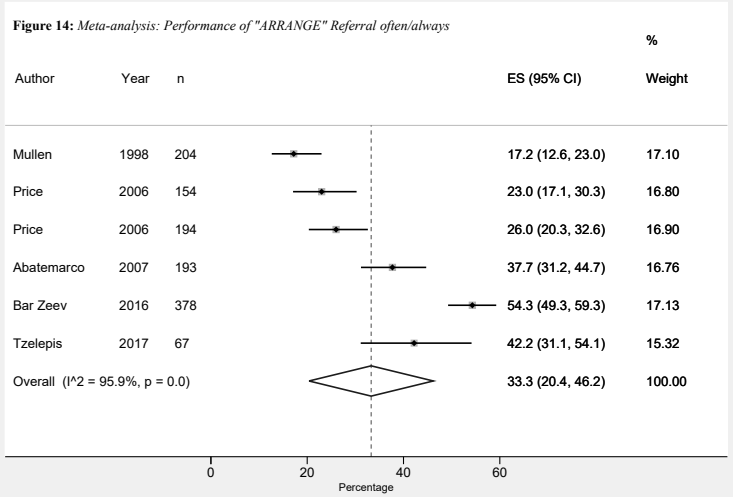


Figure 15: *Meta-analysis: "Prescribing NRT" often/always*

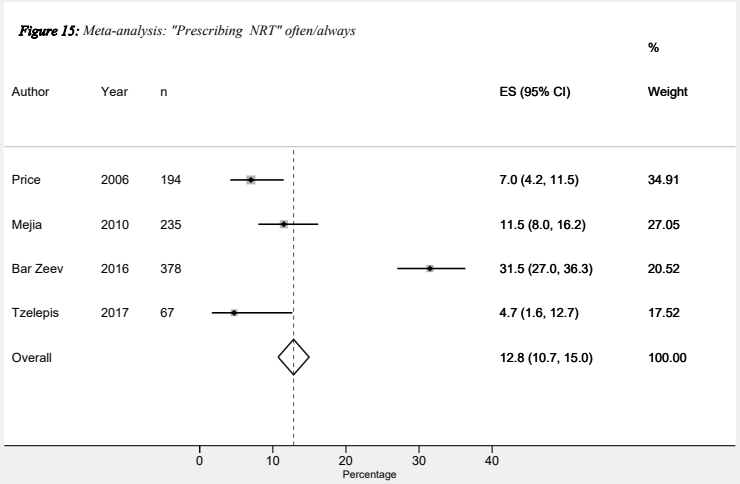
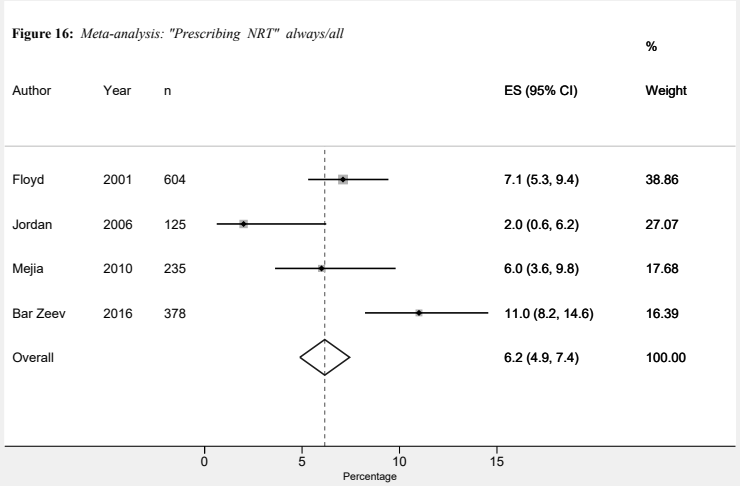


Figure 16: *Meta-analysis: "Prescribing NRT" always/all*



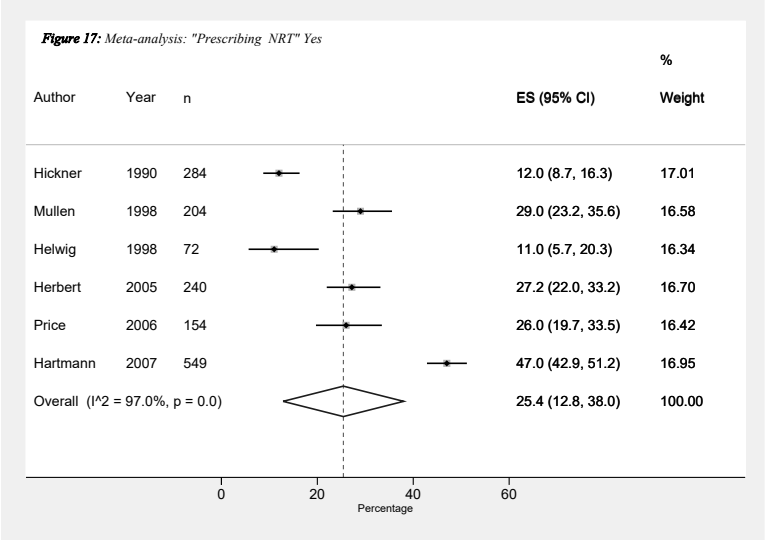


Figure 17: Meta-analysis: "Prescribing NRT" Yes
Author
Year
n
ES (95% CI)
%
Weight
Hickner 1990 284 12.0 (8.7, 16.3) 17.01
Mullen 1998 204 29.0 (23.2, 35.6) 16.58
Helwig 1998 72 11.0 (5.7, 20.3) 16.34
Herbert 2005 240 27.2 (22.0, 33.2) 16.70
Price 2006 154 26.0 (19.7, 33.5) 16.42
Hartmann 2007 549 47.0 (42.9, 51.2) 16.95
Overall (I^2 = 97.0%, p = 0.0) 25.4 (12.8, 38.0) 100.00
0
20
40
60
Percentage