Table S1. Study characteristics

Author, year, location Quality assessment	Methods (aims, design, data collection time frame)	Participants (Sample size, key sample characteristics; age, education, cigarettes smoked at baseline)	Main outcome measures (definition of cessation/relapse, timing of measurements) Relapse rate	Predictors/ associated factors examined (*potential confounders controlled for in analysis)	Analysis method	Significant associations identified in multivariate analyses († univariate analysis only)
Allen et al. 2009 [1] USA Low quality	Aim: Assess the relationship between postpartum smoking relapse and depressive symptoms. Design: Population-based cross sectional survey Pregnancy Risk Assessment Monitoring System (PRAMS) 2004	N = 2566 Age <20 years: 15.25% 20-24 years: 37.83% 25-29 years: 27.01% >29 years: 19.91% Education: <12 years: 18.31% 12 years: 41.54% >12 years: 40.16% Cigarettes per day before pregnancy: 6.34% <1 33.65% 1-5 28.34% 6-10 23.96% 11-20 4.27% 21-40 3.44% ≥41	Smoking/cessation in pregnancy: Self-report, retrospective Defined as smoking ≥ 1 cigarette per day in 3 months prior to pregnancy, and smoking 0 cigarettes per day in the final 3 months of pregnancy 2-6 months postpartum Smoking/cessation postpartum: Self-report 2-6 months postpartum 2-6 months postpartum 50.3% relapsed	Depression (responded always or often to: since baby was born, how often have you felt down, depressed or hopeless? Since baby was born, how often have you have little interest or pleasure in doing things?) Analysis controlled for: Age Education (years) Marital status Race/ethnicity Medicaid during prenatal care Trimester when prenatal care was initiated Parity Income (% of federal poverty level) Cigarettes per day prior to pregnancy Physical abuse during pregnancy Stressful events during pregnancy Months since delivery Mode of participation (mail/phone)	Chi-square Multiple logistic regression	Being depressed
Businelle et al. 2013 [2] USA High quality	Aim: Examine multiple models of potential mechanisms linking socioeconomic status and postpartum smoking relapse. Design: RCT	N = 251 8 week follow-up N = 200 26 week follow-up N = 197 Mean age = 24.6 years (SD 5.3) Mean years education = 12.9 (SD 2.0) 10.2 cigarettes per day average	Smoking/cessation in pregnancy: Self-report 30-33 weeks gestation Smoking/cessation postpartum: Expired CO (< 10ppm) Salivary cotinine (< 20 ng/ml) 8, 26 weeks postpartum	Age* Partner status* Race/ethnicity* Number of previous births* Tobacco use Negative affect/stress Agency Craving Smoking status Education Income Employment	Latent variable modelling approach	Low socioeconomic status Pre-partum craving as predictor of postpartum relapse
Carmichael et al. 2000 [3] USA High quality	Aim: Identify correlates of postpartum smoking relapse in a population-based sample of recent live births. Design: Population-based cross sectional survey PRAMS 1996	N = 17378 25.6% smokers before pregnancy Age 20-34 years = 88.3% High school education = 80.4%	Smoking/cessation in pregnancy: Self-report, retrospective 2-6 months postpartum Smoking/cessation postpartum: Self-report 2-6 months postpartum 44.5% of pre-pregnancy smokers abstinent during pregnancy 2-6 months postpartum 50.9% relapsed	Maternal race/ethnicity* Maternal education* Previous live births* Marital status (married, not married)* Weight gain during pregnancy > 35 lb* Trimester began prenatal care* Advice from health care worker about effects of smoking on baby* Stressful life events* Smoking before pregnancy (light, < 10 cigarettes per day; moderate, 10-19 cigarettes per day; heavy ≥ 18 cigarettes per day)* Infant age at survey (weeks)*	Multivariate logistic regression	African America race/ethnicity Parity (having 1 other child) Gaining weight during pregnancy Receiving no advice from a health care worker about smoking during pregnancy
Colman et al. 2003 [4] USA	Aim: Examine trends in and correlates of quitting during	N = 107,024 Age 16.5% <20 years	Smoking/cessation in pregnancy: Self-report, retrospective 2-6 months postpartum	Age* Race (white, black, other)* Parity* Maternal education (years)*	Logistic regression	Younger age Being less educated (years) Smoking >10 cigarettes per day prior to pregnancy

High quality	pregnancy and resuming smoking after pregnancy. Design: Cross sectional survey PRAMS 1993 - 1999	52.4% 20-29 years 31.1% ≥30 years Education 3.6% 0-8 years 16.7% 9-11 years 36.5% 12 years 22.3% 13-15 18.2% ≥16 years 2.6% Unknown	Smoking/cessation postpartum: Self-report 2-6 months postpartum	Pregnancy intention* Insurance before pregnancy (Medicaid, other public, private, uninsured)* Marital status (unmarried, married, unknown)* Cigarettes per day prior to pregnancy* Cigarette price* Year of birth*		
Correa-Fernandez et al 2012 [5] USA High quality	Aim: Assess the mediating effects of indicators of negative reinforcement/negative affect, positive reinforcement/positive affect, primary tobacco dependence and social support on the relationship between major depressive syndrome and anxiety syndrome with postpartum smoking relapse. Design: RCT	N = 251 Mean age 24.6 years 19% less than high school education	Smoking/cessation in pregnancy: Expired CO (< 10 ppm) Smoking/cessation postpartum: Expired CO (< 10ppm) Salivary cotinine (< 20 ng/ml) 8, 26 weeks postpartum	Major depressive syndrome (Patient Health Questionnaire) Anxiety syndrome (Patient Health Questionnaire) Mediators of these syndromes: Negative reinforcement/negative affect Positive reinforcement/positive affect (Positive and Negative Affect Schedule, PANAS) Primary dependence Social support (The Interpersonal Support Evaluation List) Other secondary dependence motives Analysis controlled for: Age Education Race/ethnicity Partner status Treatment group	Simple and multiple mediation models Linear regression	Major depressive syndrome Anxiety syndrome After controlling for major depressive syndrome, anxiety syndrome still significantly predicted relapse, however after controlling for anxiety syndrome, major depressive syndrome no longer significantly predicted relapse.
Curry et al. 2001 [6] USA High quality	Aim: Examine whether type of motivation at baseline predicts continued smoking abstinence at 8 weeks and 6 months postpartum. Design: RCT	N = 897 Mean age 27.7 years 16.9% College graduate 14.9 Average cigarettes per day prior to pregnancy	Smoking/cessation in pregnancy: Smoking/cessation postpartum: Self-report 8 weeks, 6 months postpartum 8 weeks postpartum 40% relapsed 6 months postpartum 73.3% relapsed	Motivation - Adapted version of the Reasons for quitting scale measuring intrinsic motivation (health concerns and self-control) and extrinsic motivations (immediate reinforcement and social influence) Analysis controlled for: Age Education Ethnicity Marital status Employment status Planned pregnancy Previous pregnancy Pre-pregnancy number of cigarettes per day Pre-pregnancy number of 24 hour quits Study site Treatment group	Logistic regression	8 Weeks postpartum Extrinsic motivation for quitting smoking Motivation for quitting smoking change from intrinsic – extrinsic
Gaffney et al. 2008 [7] USA High quality	Aim: Explore whether subsets of mothers of infants have unique triggers for smoking relapse during the early stages of becoming a mother. Design: Cross sectional survey	N = 133 Mean age 23.2 years (SD 4.8) High school education mean years 11.6 (SD 1.7)	Smoking/cessation in pregnancy: Retrospective self-report 2 weeks post-delivery Smoking/cessation postpartum: Self-report Expired CO (< 10 ppm) measured concomitantly 2 weeks post-delivery	Age of smoking initiation Number of cigarettes per day prior to pregnancy Prenatal nicotine dependence Proportion of close associated who are smokers Confidence to not smoke in response to traditional smoking triggers Estimate of hours/day infant cries Estimate of amount of infant fussiness Estimate of intensity of fussiness/crying	ANOVA Scheffe post-hoc analysis Kruskal-Wallis test	Thought about smoking as a response to their baby's crying† Lower confidence to refrain from smoking as a response to infant crying†

				Think about smoking as a response to infant crying Confidence to not smoke in response to infant crying		
Gilbert et al. 2015 [8] Canada High quality	Aim: To determine the rates and determinants of smoking cessation during pregnancy and smoking relapse after childbirth in Canada. Used data from the Canadian Maternity Experiences Survey. Design: Cross-sectional study Data collection time-frame: 2006-2007	N = 1586 N = 810 abstained during pregnancy	Smoking/cessation in pregnancy: Retrospective self-report 5-14 months postpartum Smoking/cessation postpartum: Retrospective self-report 5-14 months postpartum Abstinent N = 810, 53% Relapsed 416, 47% 5-14 months postpartum	Smoking frequency Place of birth (North America, outside North America) Aboriginal self-identification Age* Number of past live births Region of residence* Education (secondary not completed, secondary, post-secondary, university graduate)* Family income Lived with a smoker during pregnancy* Age of baby at time of survey (5-6 months, 7-8 months, ≥9 months) Breastfeeding* Postpartum depression Single	Multiple logistic regression	Living with a smoker Not breastfeeding Education: Completing secondary school education (compared to university graduates)
Gyllstrom et al. 2012 [9] USA High quality	Aim: Examine relationship between stressful life events and postpartum depressive symptoms to postpartum smoking relapse. Design: Cross sectional multi-modal survey Minnesota PRAMS, 2004-2006	N =1416 Age 18-24 years: 44.6% 25-34 years: 47.3% 35+ years: 8.1% Education Less than high school: 15.6% High school: 42.3% Some college: 28.9% College or more: 13.2% Pre-conception smoking intensity 66.4% 10 or fewer/day 33.6% 11 or more/day	Smoking/cessation in pregnancy: Self-report, retrospective 2-6 months postpartum Smoking/cessation postpartum: Self-report 2-6 months postpartum	Age Education (less than high school, high school, some college, college or more) Income* Marital status (married/unmarried) Pre-conception smoking intensity (≤10, ≥11 cigarettes per day) Pregnancy intention Parity* First trimester prenatal care Still breastfeeding at survey* Maternal mood (low/high)* Stressful life events 1 year prior to delivery* Postpartum depressive symptoms*	Chi-square Multivariate logistic regression	Breastfeeding at time of survey Multiparous
Harmer et al. 2013 [10] UK High quality	Aim: Determine factors associated with relapse of smoking in the early postpartum period. Design: Longitudinal cohort Child health surveillance system April 2008 – December 2009	N = 512 Mean age = 26.0 years	Smoking/cessation in pregnancy: Retrospective self-report 6 weeks postpartum Smoking/cessation postpartum: Self-report 6 weeks postpartum 238 (46.5%) relapsed by 6 weeks postpartum	Age* (< 35 years, ≥35 years) Ethnicity* Level of deprivation (Indices of multiple deprivation)* Area of residence (urban, rural)* Parity* Breast feeding status at 6 week review* Smoking by partner/other household member*	Chi-square Multivariate logistic regression, backwards likelihood ratio stepwise method	Urban area of residence Greater parity Not breastfeeding at 6 week review Smoking by partner/other household member
Hauge et al. 2012 [11] Norway Low quality	Aim: Investigate how maternal stress, conceptualised as symptoms of anxiety and depression, relationship discord and exposure to negative life events, is associated with smoking prior to and during pregnancy, and 6 months postpartum.	N = 71757	Smoking/cessation in pregnancy: Self-report (non-smoker, occasional smoker, daily smoker) Gestation week 17, gestation week 30, 6 months postpartum Smoking/cessation postpartum: Self-report 6 months postpartum 28.9% relapsed by 6 months postpartum	Anxiety and depression (low/high) (Hopkins Symptom Checklist), Relationship discord (low/high), Negative life events Analysis adjusted for: Education Age Parity Planned pregnancy Partner smoking Weight concerns	Logistic regression	High anxiety and depression

	Design: Prospective population based cohort Norwegian mother and child cohort study 1999 - 2008			Alcohol consumption during pregnancy Breastfeeding		
Kahn et al. 2002 [12] USA High quality	Aim: Investigate factors associated with maternal smoking trends over the course of pregnancy and the first three years postpartum. Design: Longitudinal population based survey Data and analysis relevant to current review was cross sectional National Maternal and Infant Health Survey 1988 - 1991	N = 8285 (those that completed longitudinal follow-up) Age at delivery 16.1% <20 years 57.4% 20-29 years 26.5% ≥30 years Education 21.9% <12 years 40.3% 12 years 23.4% Some college 14.3% College graduate	Smoking/cessation in pregnancy: Self-report, retrospective (17 months +/- 5 months postpartum) Smoking/cessation postpartum: Self-report 17 months (+/- 5 months), 35 months (+/- 5 months) postpartum 72% relapsed at 17±5 months postpartum	Education (<12 years, 12 years, some college, college graduate)* Income* Marital status (never married, formerly married, married)* Race/ethnicity* Age at delivery* Alcohol consumption* Parity* Amount smoked (packs/day)* Breastfeeding* Birthweight* Pregnant at 12 month postpartum* Prenatal weight gain* No. household smokers*	Chi-square Multivariate logistic regression	Lower education (years) Lower income ≥1 Household smoker
Kaneko et al. 2008 [13] Japan High quality	Aim: Calculate prevalence of smoking among women and their spouses before, during and after pregnancy. Clarify factors associated with smoking among pregnant women and postpartum relapse. Design: Cross sectional survey December 2004 – February 2005	N = 743 (women - men also participated in the study) Characteristics of mothers who quit smoking during pregnancy: Age 35% <30 years 65% ≥30 years Education 28% Junior high school/senior high school 72% Junior college/university	Smoking/cessation in pregnancy: Self-report Retrospective Smoking/cessation postpartum: Self-report 18 months postpartum 66.5% abstinent during pregnancy 70.3% relapsed postpartum	Age* Number of deliveries by mother* Maternal employment status* Maternal education (junior high school/senior high school, junior college/university)* Infant gender* Birthweight* Delivery method* Living with grandparent* Partner smoking during pregnancy* Awareness of harmful effects of second hand smoke* Breastfeeding duration* Stress related to childcare*	Cox proportional hazard model Multivariate logistic regression	Age < 30 years Breastfeeding duration < 6 months
Ko et al. 1998 [14] USA High quality	Aim: Examine sociodemographic characteristics and breastfeeding behaviour related to smoking cessation and relapse among pregnant smokers. Design: Population survey Cross sectional 'Pregnancy and smoking' supplement of 1991 National Health Interview Survey 1991	N = 1403 Education 30% Less than high school education 47% High school graduates 23% Some education beyond high school	Smoking/cessation in pregnancy: Retrospective self-reported smoking in pregnancy Up to five years postpartum. Smoking/cessation postpartum: Self-report, relapse after pregnancy Up to 5 years postpartum 1% of women (N=21) remained abstinent postpartum having quit during pregnancy	Age Education (< high school, high school, > high school) Income Breastfeeding	Chi-square Analysis of variance	Age† Education† Breastfeeding †
Kong et al. 2008 [15]	Aim:	N = 117 included in analysis	Smoking/cessation in pregnancy: Self-report	Age Occupation	T-test Chi-square	Pregnancy unplanned†

China, Hong Kong Low quality	Investigate smoking habits of women and their partners during pregnancy. Design: Longitudinal cohort survey 2001 – 2003 Follow up carried out in 2004	'Ever-smoker' characteristics: Mean age 26.1 Education 4.4% Tertiary education 90% Secondary education 5.2% ≤ Primary education	Smoking/cessation postpartum: Self-report 1-2 years postpartum 59% relapsed by time of postal survey	Education (tertiary, secondary school, ≤ primary school) Marital status Unplanned pregnancy Nullparity Partner's employment status Smoking habit in pregnancy (stop smoking during pregnancy, stop smoking before pregnancy) Cigarettes per day prior to pregnancy Previous recreational drug use Partners smoking habit – current and during pregnancy Partner's smoking habit in pregnancy		Women's smoking habit in pregnancy (stopped smoking before pregnancy)†
Lelong et al. 2001 [16] France High quality	Aim: Estimate risk and describe factors associated with postpartum smoking relapse. Design: Longitudinal survey 'Women's health' Survey & 'Child rearing practices' 1993 - 1995	Survey A: n =685 Cigarettes per day before pregnancy 42.3% ≤10 40.3% 11-20 17.4% ≥21 Survey B: n = 636 Cigarettes per day before pregnancy 50.4% ≤10 35.8% 11-20 13.8% ≥21	Survey A: Smoking/cessation in pregnancy: Self-report Delivery Smoking/cessation postpartum: Self-report 5-6 months postpartum Survey B: Smoking/cessation in pregnancy: Retrospective self-report (6 months postpartum), abstinent at any point during pregnancy Smoking/cessation postpartum: Self-report, 6 months postpartum	Cigarettes per day before pregnancy Age (≤29, ≥30) Parity Marital status Education (low, intermediate, high) Working during pregnancy Husband employment status Husband smoker at 6 months Participation in antenatal course Breastfeeding at hospital discharge, Working at 5-6 months Analysis adjusted for survey	Chi-square, Mantel-Haenszel test	Husband smoker at 6 months†
Lemola et al. 2008 [17] Switzerland Low quality	Aim: Investigate impact of maternal and paternal grandparent smoking behaviour on maternal smoking, smoking cessation during pregnancy and relapse in first 17 months post-delivery. Design: Longitudinal survey March – July 2004	N = 374 Education 5.3% Secondary I 65.5% Secondary II 29.1% Tertiary	Smoking/cessation in pregnancy: Self-report Before and after learning of pregnancy Smoking/cessation postpartum: Self-report, number of cigarettes per day 6 weeks, 5 & 17 months postpartum	Woman's mother smoking Woman's father smoking Woman's father in law smoking Woman's mother in law smoking* Father smoking*	Kaplan-Meier Multiple regression	Mother in law smoking Father smoking
Letourneau et al. 2007 [18] USA Low quality	Aim: Identify timing of, and factors associated with return to smoking after pregnancy. Design: Exploratory prospective pilot study Longitudinal cohort April 2003 – June 2004	N = 37 (included in analysis) 22% 19 years or younger 35% < High school 30% High school 35% Some college	Smoking/cessation in pregnancy: Smoking/cessation postpartum: Urinary cotinine (≤2 ng/ml) 2 weeks postpartum	Race Age (≤ 19, ≥20 years) Number of children Education (high school graduate or less, some college or more) Marital status Breastfeeding (y/n) Discussed smoking during pregnancy with doctor/nurse Ever smoked 1 cigarette during pregnancy Age when started smoking Number of quit attempts Presence of smoker in household Belief smoking keeps weight down	Univariate, Fisher's exact test	Race (black ethnicity)† Education (high school graduate or less)† Breastfeeding† Discuss smoking during pregnancy with doctor or nurse† Presence of smoker in household†

				Number of cigarettes smoked before stopping Alcohol during pregnancy Partner smokes		
Levine et al. 2010 [19] USA High quality	Aim: Examine relationship of weight concerns and mood experienced during pregnancy in the context of other demographic and situational factors that may affect postpartum smoking relapse. Design: Longitudinal cohort February 2003 – November 2006	N = 183 Mean age 24.2, (SD 5.4) years 81.9% High school graduate or more Mean 13.7 cigarettes per day pre- pregnancy 76.2% quit smoking before/during 1st trimester	Smoking/cessation in pregnancy: Expired CO (≤8 ppm) 3rd trimester Smoking/cessation postpartum: Expired CO (≤8 ppm) 6, 12, 24 weeks postpartum Abstinence 53.5%, 37.7% and 34.7% at 6, 12 and 24 weeks respectively	Smoking specific weight concerns (weight self-efficacy, general weight concerns) General weight concerns (restraint, disinhibition, hunger) Mood (perceived stress, CES-D, positive affect, negative affect) Analysis controlled for: Pre pregnancy nicotine dependence Partner smoking status Race Alcohol use Intention to breastfeed	T-tests Chi square Cox regression models	Smoking specific weight concerns
McBride et al. 1990 [20] USA Low quality	Aim: Describe patterns of smoking relapse in a sample of postpartum women. Assess perceived importance of smoking relapse in sample of postpartum women. Identifying potential high risk situations for postpartum smoking relapse. Design: Cross sectional survey October 1986	N = 567 16.64 average cig/day prior to pregnancy Relapsed; abstaining (6 months postpartum) Age (relapsed; abstained) 29%; 18% 18-24 51%; 46% 25-30 17%; 23% 31-34 2%; 14% 35 and over Education (relapsed; abstained) 44%; 32% High school or less 39%; 36% Some college 17%; 32% College graduate	Smoking/cessation in pregnancy: Retrospective self-report ('off cigarettes for most of pregnancy') 5-9 months postpartum Smoking/cessation postpartum: Self-reported smoking since delivery 5-9 months postpartum 56% relapsed at 30 days postpartum	Age Education (high school or less, some college, college graduate) Parity Sickness during pregnancy Mean weeks sick during pregnancy % Breastfed Mean weeks breastfeeding Mean number of cigarettes smoked prior to pregnancy Partner smoking Proportion of friends who smoke Mean weight concern (1-10 likert scale) Mean week of pregnancy first tried to quit	Chi square One-way and two-way ANOVA Discriminant analysis	Fewer weeks sick during pregnancy† Fewer weeks breastfeeding† Partner smoking† Weight concern†
McBride et al. 1992 [21] USA High quality	Aim: Describe temporal pattern of postpartum relapse. Identify high risk times for postpartum relapse. Identify psychosocial predictors of postpartum relapse. Design: Prospective cohort survey Not known	N = 116 Mean age 26.5 years Education 9% < High school 32% High school 36% Some college 21% College graduate 3% Advanced degree Smoking 16.5 Cigarettes per day on average prior to pregnancy	Smoking/cessation in pregnancy: Self-report, 3rd trimester Smoking/cessation postpartum: Self-report Salivary cotinine (< 20 ng/ml) 6 weeks, 6 months postpartum	6 weeks postpartum Number of cigarettes smoked prior to pregnancy* Age* Spouse's smoking status* Unmarried* Perceived likelihood will return to desired weight by 6 months postpartum* Thought about own health to cope with urges to smoke* Avoided situations where others were smoking* Snacked to resist urges to smoke* Proportion of family who smoke* 6 weeks – 6 months postpartum: Baseline belief of benefits of smoking to the woman (SBS)* Breastfed* Spouse smokes* Unmarried* Baseline situational self-confidence* Snacked during pregnancy to resist smoking*	ANOVA Cross tabulation Stepwise logistic regression	6 weeks postpartum: Snacked to resist urges to smoke 6 weeks – 6 months postpartum: Thought more about money saved in early postpartum to resist smoking

				Perceived helpfulness of spouse/best friend in early postpartum* Snacked in early postpartum to resist smoking* Thought about money saved in early postpartum to resist smoking* Global self-confidence in postpartum could continue to resist smoking*		
Mullen et al. 1997 [22] USA High quality	Aim: Describe the probability of smoking relapse during the first 6 months after birth. Identify factors that increase relapse. Design: RCT. Prospective design during pregnancy and retrospective report at 6 months postpartum. July 1985 – June 1987	N = 127 Age 18-19 years – 14.2% 20-29 years 61.9 ≥30 18.9 Education ≤High school 16.5% High school graduate 41.7% Some college 31.5% ≥college graduate 10.2% Cigarettes per day prior to pregnancy <10 66.9% 11-19 9.4% ≥20 23.6%	Smoking/cessation in pregnancy: Urinary cotinine (<10 ng/ml) before 20 weeks gestation Smoking/cessation postpartum: Self-report, any smoking since birth of baby, even a puff Relapse 62.9% 6 months	Puffs in late pregnancy Friends smoke Less confidence, mid pregnancy Partner smokes (postpartum) Smokers in household (postpartum) Passive exposure postpartum	Kaplan-Meir product-limit methods of survival analysis Chi-square One-way analysis of variance Cox proportional hazard model Cox-proportional hazards regression model	Having smoked puffs of a cigarette in late pregnancy Having friends who smoke Less confidence that abstinence could be maintained postpartum A partner who smokes postpartum
O'Campo et al. 1992 [23] USA High quality	Aim: Examine associations between sociodemographic factors and pre-pregnancy, pregnancy and early postpartum smoking behaviour Design: Prospective cohort survey March 1985 – August 1986	N = 1900 Selected for interview 1 N = 847 Selected for interview 2 N = 657 Smokers prior to pregnancy Age < 25 years 41% ≥ 25 24% Education <12 years 48% 12 years 35% >12 years 20%	Smoking/cessation in pregnancy: Self-report, quit prior to pregnancy or in 1st trimester Smoking/cessation postpartum: Self-report, 1-3 and 6-12 weeks postpartum Relapsed: 39%; 70% by 3 weeks, 30% between 6-12 weeks postpartum	Infant feeding method (formula, breastfeeding)* Race (black, white)* Education (< 12 years vs 12 years, < 12 years vs ≥ 12 years)* Age (< 25 years, ≥ 25 years)* Parity* Marital status (unmarried, married)*	Bivariate, multivariate regression, logistic regression	Formula feeding infant
Park et al. 2009 [24] USA Low quality	Aim: Determine whether postpartum decline in perceived support is associated with return to smoking in postpartum period. Design: Repeated measures observational study January – October 2005	N = 65 Mean age 28.8 years Education 7.7% Less than high school 53.8% High school graduate/some college 38.5% College graduate plus 8.4 cigarettes per day prior to quit	Smoking/cessation in pregnancy: Self-report At delivery Smoking/cessation postpartum: Self-report, previous 7 days 12, 24 weeks postpartum Relapse 10% 2 weeks 25% 6 weeks 37% 12 weeks 47% 24 weeks	Emotional support Informational support Baby assistance support Smoking specific support Change in (slope): Emotional support Informational support Baby assistance support Smoking specific support	Univariate analysis Wilcoxon rank sum tests Mixed-effects regression models	Lower perceived levels of emotional support† Decrease in smoking specific support (0-24 weeks)† Decrease in smoking specific support (0-12 weeks)†
Park et al. 2009 [25] USA Low quality	Aim: Determine if postpartum worsening of depressive, anxiety and stress symptoms is associated with postpartum smoking relapse.	N = 65 Mean age 28.8 years Education 7.7% Less than high school	Smoking/cessation in pregnancy: Self-report At delivery Smoking/cessation postpartum: Self-report, previous 7 days 12, 24 weeks postpartum	Univariate: Age Education (less than high school, high school graduate/some college, college graduate or more) Insurance type Marital status (married/living with partner)	Univariate analysis Fisher's exact tests Wilcoxon rank sum tests Mixed-effects regression models	Univariate only: Increased parity† Unhappy/unsure about pregnancy† Ever struggled with depression†

	Design: Repeated measures observational study January – October 2005	53.8% High school graduate/some college 38.5% College graduate plus 48.3% Private insurance 8.4 cigarettes per day prior to quit	Relapse 10% 2 weeks 25% 6 weeks 37% 12 weeks 47% 24 weeks	Race/ethnicity Nulliparous Unhappy/unsure about pregnancy Cigarettes per day prior to pregnancy Weeks quit Desire to stay quit Spouse current smoker Depression (Beck Depression Inventory) Anxiety (Beck Anxiety Inventory) Stress (Perceived Stress Scale) Ever struggled with depression Ever struggled with anxiety Had mood counselling during pregnancy Change in (slope): Depression (Beck Depression Inventory) Anxiety (Beck Anxiety Inventory) Stress (Perceived Stress Scale) Total scale (depression, anxiety, stress)		Had mood counselling during pregnancy† Change in depression 0-24 weeks postpartum Increase in total scale (depression, anxiety, stress) 0-24 weeks postpartum Increase in depression 0-12 weeks postpartum Increase in total scale (depression, anxiety, stress) 0-12 weeks postpartum
Polanska et al. 2005 [26] Poland High quality	Aim: Evaluate risk of postpartum smoking relapse one year post-delivery. Design: Randomised trial 2002 - 2003	N = 175 Age 5.7% 18 years or less 77.7% 19-30 years 16.6% >30 years Education 62.9% Primary or vocational 37.1% College or university Smoking during pregnancy (cigarettes per day) 15.4% <5 56.0% 5-10 28.6% >10	Smoking/cessation in pregnancy: Self-report abstinence before delivery Smoking/cessation postpartum: Self-report 12 months postpartum Relapse 50% 12 months postpartum	Age Education (primary or vocational, college or university) Marital status (married, unmarried) Number of children Duration of smoking Smoking before pregnancy Fagerstrom test* Husband or other household member smoking* Quitting smoking during pregnancy Intervention group*	Univariate logistic regression Multivariate logistic regression	Quit smoking before 14 weeks of pregnancy: Higher nicotine dependence (Fagerstrom test) Husband/other household member smoking Intervention group Quit smoking after 14 weeks of pregnancy: Fagerstrom test Intervention group
Polanska et al. 2011 [27] Poland High quality	Aim: Identify factors which predispose postpartum women to smoking relapse to develop interventions to reduce rate of relapse. Design: Prospective cohort 2004 - 2005	N = 138 Age 5.8% 16-19 72.5% 20-29 21.7% 30 or older Education 37.7% Primary or vocational 62.3% College or university	Smoking/cessation in pregnancy: Self-report Salivary cotinine (< 10ng/ml) Smoking/cessation postpartum: Maintaining abstinence continuously for 3 months postpartum (< 1 cigarette) Self-report Salivary cotinine (<10 ng/ml) 3 months postpartum Relapse 50% 3 months postpartum	Age Marital status (married, unmarried) Parity Education (primary or vocational, college or university) Employment status Costs of cigarettes (big expense, not big expense) Self-control of life circumstances Persistence in pursuing a life goal Determination to achieve a life goal Thinking about the impact of daily routines on health Satisfaction with life Years of smoking Cigarettes per day Time of first cigarette after waking up Previous attempts to quit smoking Smoking as a big pleasure Smoking helps to cope with stressful situations* Time of quitting smoking* Feeling an urge to smoke* Negative experience after quitting smoking Positive experience after quitting smoking	Univariate regression Multivariate logistic regression	Univariate: Thinking about the impact of daily routines on health† Cigarettes per day† Smoking as a big pleasure † Smoking helps to cope with stressful situations † Time of quitting smoking† Feeling an urge to smoke† Negative experience after quitting smoking† Type of quitting attempt (long-term quitting, quitting only for pregnancy and postpartum)† Smoking environment at home† Partner's support in being a non-smoker† Breastfeeding† Multivariate: Time of quitting smoking (quitting later in pregnancy)

				Type of quitting attempt (long-term quitting, quitting only for pregnancy and postpartum period)* Post delivery: Smoking environment at home* Number of friends who smoke Partner's support in being a non-smoker Smoking as a big pleasure Number of correct answers to questions on adverse effects of smoking Mother's feeling after delivery (happy, glad) Breastfeeding*		Type of quit attempt (quitting only for pregnancy and postpartum) Feeling an urge to smoke a few times a week or more Smoking environment at home Smoking helps to cope with stress situations Not breastfeeding (Note – only multivariate associations considered significant in results table to ensure consistency with other studies reported)
Prady et al. 2012 [28] UK High quality	Aim: Develop predictive model of factors previously found to be associated with postpartum smoking relapse. Examine whether associations changed depending on whether risk factors were measured around the time of birth or several months postpartum. Design: Prospective cohort survey (Millennium cohort study) Data analysed as cross-sectional 2000 - 2001	N = 1829 Education 74.0% More education 26.0% Less education	Smoking/cessation in pregnancy: Retrospective self-report quit any time during pregnancy Approximately 9 months post-delivery Smoking/cessation postpartum: Self-report, any amount of smoking 9 months postpartum Relapse 57.3% 9 months	Marital status By marital status, covariates measured at birth: Age below median* Manual social class* Not managing financially* Other children* Less education* Not white* Quit after first trimester* Less than happy about pregnancy* Late/no entry into antenatal care* Breastfeeding* Partner smoking/quitting during pregnancy* By marital status, covariates measured at birth and additional covariates measured at 9 months postpartum: Age below median* Manual social class* Not managing financially* Other children* Less education* Not white* Quit after first trimester* Less than happy about pregnancy* Late/no entry into antenatal care* Breastfeeding* Partner smoking/quitting during pregnancy* No one to share feelings with* Alcohol* Psychological distress*	Weighted t-tests Chi square Multivariate logistic regression, weighted for complex survey design Sensitivity analysis	Marital status Covariates measured at birth: Married: Other children Breastfeeding (never breastfed/breastfed for a few days) Partner smoked during pregnancy Cohabiting: Breastfeeding (never breastfed baby) Partner smoked during pregnancy Single: Not managing financially Other children Covariates measured at birth and additional covariates measured at 9 months postpartum: Married: Other children Breastfeeding (never breastfed, breastfed for a few days) No one to share feelings with Alcohol (drinks > once a month up to 2 x weekly) Partner smoking (partner relapsed, partner sustained quitter, partner sustained smoker) Cohabiting: Breastfeeding (never breastfed) Alcohol (drinks > once a month up to 2 x weekly)

						Partner smoking (partner sustained quitter, partner sustained smoker) Single: Not managing financially Other children Alcohol (drinks < once a month)
Ratner et al. 1999 [29] Canada High quality	Aim: Examine temporal order of postpartum smoking relapse and weaning. Examine if association between smoking relapse and weaning is confounded by other factors. Design: RCT February – September 1996	N = 228 27.8 Mean age (range 16-40) Education 14.9% <High school 26.3% High school 36.8% Some/completed technical/college 21.9% Some/completed university Mean cigarettes per day prior to quitting: 10.6 (SD 7.2)	Smoking/cessation in pregnancy: Self-report Immediately after birth Smoking/cessation postpartum: Self-report (daily smoking) Verified expired CO (< 10ppm) 6 months postpartum	Early weaning Analysis controlled for: Education* Returned to work within 6 months* Number of weeks intended to breastfeed at birth*	Cross tabulations Multiple logistic regression	Early weaning
Rockhill et al. 2016 [30] USA High quality	Aim: Monitor annual postpartum smoking relapse estimates, assess trends over time and describe maternal characteristics associated with relapse among women who quit smoking during pregnancy. Design: Cross-sectional study PRAMS 2009-2011	N = 13076 across 32 sites Overall demographic characteristics not reported	Smoking/cessation in pregnancy: Self-report 2-6 months postpartum Smoking/cessation postpartum: Self-report 2-6 months postpartum Relapsed: 44%	Maternal age Maternal race/ethnicity Maternal education Marital status Pregnancy intention Parity WIC enrolment during pregnancy Breastfeeding initiation Pre-pregnancy smoking status (non-daily smoker/daily smoker) Number of stressors experienced in 12 months before birth Smoking ban in home Preterm/low birth weight infant Analysis controlled for: Site, infant year of birth, maternal age, maternal race/ethnicity, maternal education, marital status, pregnancy intention, parity, WIC enrolment during pregnancy, breastfeeding duration, pre-pregnancy daily number of cigarettes, number of stressors, smoking ban in home, preterm/low birth weight infant	Multiple logistic regression	Younger maternal age White, non-Hispanic ethnicity Pregnancy unintended Parity (second or later birth) Never breastfed Pre-pregnancy daily smoker Partial ban or no smoking ban at home
Roske et al. 2006 [31] Germany High quality	Aim: To examine the intention to resume smoking in the post-partum period and its predictive value for smoking within 12 months post-partum Design: RCT May 2002 – March 2004	N = 301 Education 11% <10 years 62% 10 years 27% >10 years FTND sum score prior to pregnancy 67% 0-2 (low) 21% 3-4 (middle) 12% ≥5 (strong	Smoking/cessation in pregnancy: Self-report – quit smoking at any point during pregnancy Smoking/cessation postpartum: Self-report – 6 and 12 months postpartum Abstinent: 100% (inclusion criteria) Relapsed: N = 147, 48.8% 12 months postpartum	Intention to resume smoking* Age* Living in a steady partnership* School education (< 10 years, 10 years, > 10 years)* Household income* First child* Age of onset of regular smoking* Fagerstrom test sum score* Number of months currently abstinent* Smoking partner* Experimental group status*	Chi-squared Logistic regression	Intention to resume smoking Fewer number of months currently abstinent

Simmons et al. 2014 [32] USA High quality	Aim: To determine whether certain variables tested during pregnancy predicted resumed smoking at 1 month and 1 year postpartum Design: RCT Data collection time-frame: Not known	N = 504 Average age 25.8 years Education Less than high school diploma 9.1% High school diploma 35.1% College or technical school 55.8% Average smoked prior to quitting 15.2 cigarettes per day for 8.6 years	Smoking/cessation in pregnancy: Self-report – no smoking in previous 7 days at baseline assessment 2nd-3rd trimester Smoking/cessation postpartum: 1, 8 and 12 months postpartum Self report – no smoking in previous 7 days at each assessment stage 22 women provided biosample; 21 were consistent with the self-report Relapsed: 1 Month: 27.2% 12 Months: 39.9%	1 month: Not planning to quit for good* Less confident of not smoking 6 months postpartum* Another smoker in household* Partner smoked as much as before pregnancy Not planning to breast feed* Less education than diploma/GED Lower partner positive support style Fewer total years of smoking 12 months: Not planning to quit for good* Less confident of not smoking 6 months postpartum Partner smoked as much as before pregnancy* Another smoker in household Variables measured at 1 month predictive of 12 months smoking: Smoking at 1 month* Less confident of not smoking in 6 months* Lower partner support rating Partner currently smokes Analysis controlled for intervention group*	Backward stepwise regression, multivariate logistic regression	1 month postpartum: Not planning to quit for good Less confident of not smoking in 6 months postpartum Another smoker in household Not planning to breastfeed 12 months postpartum: Not planning to quit for good Partner smoked as much as before pregnancy Measures at 1 month postpartum that predict relapse 12 months postpartum: Smoking at 1 month Less confident of not smoking in 6 months
Simonelli et al. 2012 [33] USA High quality	Aim: Examine stage of change, decisional balance and temptation to smoke among postpartum women who claimed intention to remain abstinent post-delivery. Design: Prospective longitudinal survey November 2005 – May 2007	N = 113 after lost to follow-up and exclusions for indicating an intention to return to smoking Eligibility for inclusion in analysis: Participants identified to be in acquisition-Precontemplation in Acquisition Stage of Change. Age Mean 27.9 Median 28 Range 16-43 Education 13.2% <High school 25% High school 54.86% High school + 6.94% College +	Smoking/cessation in pregnancy: Retrospective self-report Smoking/cessation postpartum: Self-report, smoking in previous 7 days 8 weeks postpartum	Cluster group (developed from Decisional Balance Inventory, Situational Temptations Inventory): • High risk *(high temptations to smoke, high perceived pros of smoking and average perceived cons of smoking** • Risk denial *(temptations to smoke close to the mean, higher than average perceived pros of smoking, lower than average perceived cons of smoking** • Ambivalent *(perceived pros and cons of smoking close to group mean, temptations to smoke close to group mean)** • Protected *(low temptations to smoke, low perceived pros of smoking, perceived cons of smoking close to the mean)** Sociodemographic characteristics: Age* Partner smoking* Education* Breastfeeding*	Cluster analysis to identify subgroups Logistic regression	Members of the high risk (high temptations to smoke, high perceived pros of smoking and average perceived cons of smoking) more likely to relapse Members of the risk denial clusters *(temptations to smoke close to the mean, higher than average perceived pros of smoking, lower than average perceived cons of smoking)* more likely to relapse Not breastfeeding
Solomon et al. 2007 [34] USA High quality	Aim: Examine predictors of postpartum relapse Design: Pilot RCT	N = 87 Mean age (SD) Postpartum abstainers 26.6 (5.1) Relapsed by 6 months 24.2 (5.2) Education (years) (SD) Postpartum abstainers 13.8 (2.0) Relapsed by 6 months 12.9 (2.8)	Smoking/cessation in pregnancy: Urinary cotinine <80ng/ml Smoking/cessation postpartum: Urinary cotinine <80ng/ml 2, 4, 8 weeks, 3 and 6 months postpartum	Age Education (years) Weeks gestation at baseline Primagravida Married With private insurance Cigarette per day pre-pregnancy* Abstinent at baseline Cigarettes per day at baseline	Chi-square tests Stepwise logistic regression	Greater number of cigarettes smoked per day pre-pregnancy Higher number of friends/family smoking Higher beck depression inventory score at end of pregnancy

		Cigarettes per day pre-pregnancy Postpartum abstainers 10.1 (6.2) Relapsed by 6 months 15.2 (7.8)		Living with another smoker Smoking allowed in the home Friends/family smoking* Days in past 7 near others smoking Plans to smoke postpartum Brief symptom inventory global score Beck depression inventory score at end of pregnancy* Stress Weight concern* Control/intervention group*		Greater weight concern associated with decreased risk of return to smoking
Stotts et al. 2000 [35] USA High quality	Aim: To predict postpartum return to smoking among pregnant quitters. Design: RCT Participants included in current study were control group only. Project PANDA February 1991 – April 2004	N = 256 Mean age 27 years Education – high school or higher 78%	Smoking/cessation in pregnancy: Self-report smoking Alongside random sample of urinary cotinine on 76 women at 28 weeks gestation Smoking/cessation postpartum: Self-reported smoking since delivery or previous assessment time point 6 weeks, 3, 6 and 12 months postpartum 44% relapsed at 6 weeks postpartum 55% relapsed 3 months postpartum 53% relapsed 6 months postpartum 68% relapsed within 12 months	Stages of change for postpartum smoking cessation: precontemplation (PC), contemplation (C), preparation (PA), or action (A) stages of change. *Intake Smoking* (smoking at intake versus those who had quit just prior to their first prenatal visit) Partner Smoking* Breastfeeding	Logistic regression Chi-square	Having a smoking partner Stages of change classification (precontemplation stage most likely to relapse, decreasing with each subsequent stage, that is, at 6 weeks 83% of PCs, 64% of Cs, 35% of PAs, and 24% of As had returned to smoking) This remained when adjusting for partner smoking
Thyrian et al. 2006 [36] Germany High quality	Aim: Describe population based sample of postpartum women who smoked before pregnancy on the grounds of perceived advantages and disadvantages of non-smoking & self-efficacy not to smoke. Identify clusters that can differentiate between these women. Design: RCT, two factorial design May 2002 – March 2003	N = 317 Mean age 27.27 (SD 5.28) Education < 10 years 11.4% 10-11 years 62.5% >11 years 26.0% Mean cigarettes per day, prior to pregnancy 12.84 (SD 6.76) 298 at 6 months 285 at 12 months	Smoking/cessation in pregnancy: Smoking/cessation postpartum: Self-report smoking in previous 4 weeks 12 months postpartum	Clusters: Cluster 1 'High risk' - average-value for the pros of non-smoking, raised T-value of the cons of non-smoking, below average T-value of self-efficacy Cluster 2 'Premature group' – low T-value for pros of non-smoking, average T-values on the cons of non-smoking and average T-value on self-efficacy Cluster 3 'ambivalent group' – average T-values on pros of non-smoking, cons of smoking and self-efficacy Cluster 4 'protected group' – above average T-values on the pros of non-smoking, below average on the cons of non-smoking, above average self-efficacy Age Other smokers in the home Education (< 10 years, 10-11 years, > 11 years) Breastfeeding Treatment group	Cluster analytic approach Logistic regression	Being a member of cluster 1 (high risk) Being a member of cluster 2 (premature group) Being a member of cluster 3 (ambivalent group) Age Other smokers in the home Education (< 10 years, 10-11 years, > 11 years) Breastfeeding
Tran et al. 2013 [37] USA High quality	Aim: To determine if there was an association between smoking cessation intervention during pregnancy and postpartum smoking relapse, and to define a time trend of postpartum smoking relapse after delivery Design:	N = 2,938 Completed college: 47.1% Did not complete high school: 14.7%	Smoking/cessation in pregnancy: Retrospective self-report, 3 months prior to pregnancy, last 3 months of pregnancy Smoking/pregnancy postpartum: Self-report average of zero cigarettes per day at time of survey completion – 2-3 months (69% participants), 4-5 months (27.3%), 3.5% (6+ months)	Smoking cessation intervention during pregnancy (no intervention, only counselling, counselling with treatment and/or referral)* Time after delivery (months)* Breastfeeding status* Age* Maternal education (< high school, high school, > high school)* BMI before pregnancy* Smoking before pregnancy (cigarettes per day)*	Multiple logistic regression	Increased time after delivery Never breastfed/not currently breastfeeding, Overweight/obese prior to pregnancy Ethnicity (black) Stressful life events (3+) Postpartum depression

	Cross-sectional study PRAMS 2004-2008		Abstinent: 100% - last 3 months of pregnancy (inclusion criteria) Relapsed: 48.1% 2-3 months 60.7% 4-5 months 70.5% 6+ months	Race* Marital status* Delivery paid by Medicaid* Number of stressful life events before pregnancy* Postpartum depression (sometimes, always/almost always, never/rarely)*		
Yasuda et al. 2013 [38] Japan High quality	Aim: Determine smoking relapse rate among women quit during pregnancy and associated factors with smoking relapse in representative sample. Design: Cross sectional Health Parents and Children 21 cohort May – July 2009	N = 2135	Smoking/cessation in pregnancy: Self-report, retrospective Smoking/cessation postpartum: Self-report 3-4 months, 18 months, 36 months postpartum	Age at childbirth (years) Birth order Parenting satisfaction Time with child in relaxed mood Lack of confidence in childrearing Employment at time of survey Maltreatment of child Alcohol drinking at time woman became pregnant Alcohol drinking during pregnancy Partner to talk to Grandmother/grandfather to talk to Neighbour to talk to Friend to talk to Doctor to talk to Public health nurse or midwife to talk to Nursery school or kindergarten teacher to talk to Telephone counsellor Internet No one to talk to Partner smoking at time woman became pregnant Partner smoking during pregnancy Partner smoking after childbirth Partner participation in childrearing Partner plays with child *Aanalysis controlled for woman's age at time of childbirth and time of survey after birth.	Chi-square Logistic regression	The child being second or later in the birth order A partner who smoked at the time the woman became pregnant, during her pregnancy or after she gave birth, Maternal employed at time of the survey after childbirth
Yoon et al. 2007 [39] Canada High quality	Aim: Examine whether baseline discounting of hypothetical monetary rewards early in pregnancy would predict smoking status at 24 weeks postpartum in spontaneous quitters enrolled in a randomised trial on relapse prevention. Design: Clinical trial	N = 48 Mean age 25.9 (SD 5.1) Education > 12 years 54% Mean cigarettes per day prior to pregnancy 9.6 (SD 6.0)	Smoking/cessation in pregnancy: Self-report of quitting smoking after discovering pregnancy but prior to first prenatal care visit + biochemical validation at trial intake interview (average of 10.5 weeks into pregnancy and before 25 weeks) Smoking/cessation postpartum: Self-reported smoking in prev 7 days Urinary cotinine (> 80ng/ml) 24 weeks postpartum Assessed weekly for first month, every other week up to 12 weeks postpartum, and at 24 weeks postpartum	Delay discounting (measure of impulsivity)	Chi-square Stepwise multivariate logistic regression	24 weeks postpartum: Baseline low delay discounting associated with relapse

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