National Institute for Health and Care Excellence

Draft for consultation

Antenatal care

[I] Number of antenatal appointments

NICE guideline tbc

Evidence reviews underpinning recommendations 1.1.6 to 1.1.8

February 2021

Draft for consultation

These evidence reviews were developed by the National Guideline Alliance which is a part of the Royal College of Obstetricians and Gynaecologists

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Review question

Is a reduced number of antenatal appointments as effective as standard care?

Introduction

Antenatal care is important for positive pregnancy outcomes and for the wellbeing of the mother and baby. It is thought that women with uncomplicated pregnancies might not need as many antenatal appointments as those women who have complications in their pregnancy. However, the number of appointments required to still achieve beneficial outcomes has not yet been established. The aim of this review is to determine whether a reduced number of antenatal appointments is as effective as standard care.

Summary of the protocol

Please see Table 1 for a summary of the Population, Intervention, Comparison and Outcome (PICO) characteristics of this review.

Table 1: Summary of the protocol (PICO table)

Population	All pregnant women
Intervention	A different number of antenatal appointments compared to standard care
Comparison	Standard care

Outcomes	**Critical**
	• Severe maternal morbidity up to 42 days post-birth
	  ○ Admission to inpatient psychiatric services
	  ○ Admission to ITU
	  ○ Maternal death
	• Any fetal death (after 24^{+0} weeks)
	  ○ Stillbirth
	  ○ Perinatal death
	
	Important
	• Admission to hospital for treatment of adverse pregnancy/obstetric outcomes
	• Preparedness for birth
	• Women's experience and satisfaction of antenatal care
	• Admission to neonatal unit
	• Undiagnosed small for gestational age (SGA)

ITU: intensive treatment unit

For further details, see the review protocol in appendix A.

Methods and process

This evidence review was developed using the methods and process described in Developing NICE guidelines: the manual 2014. Methods specific to this review question are described in the review protocol in appendix A.

Declarations of interest were recorded according to NICE's conflicts of interest policy.

Clinical evidence

Included studies

Seven studies reporting 6 randomised controlled trials (RCTs) were identified for this review, all of which examined whether a reduced number of antenatal appointments is as effective as standard care (Binstock 1995, Butler 2019, Jewell 2000, McDuffie 1996 & 1997, Sikorski 1996, Walker 1997).

The included studies are summarised in Table 2

The number of appointments comprising a reduced number of appointments and the number of appointments comprising standard care varied: 1 RCT compared a 6/7-visit schedule to a 13 visit schedule (Sikorski 1996); 1 RCT compared an 8-visit schedule to a 13-visit schedule (Binstock 1995); 1 RCT compared an 8-visit schedule to a 14-visit schedule (Walker 1997); 1 RCT compared a 9-visit schedule to a 14-visit schedule (McDuffie 1996,1997); 1 RCT compared a 7/8-visit schedule to a 13-visit schedule (Jewell 2000). In 2 RCTs (Jewell 2000 and Sikorski 1996) the number of appointments in the reduced schedule was altered according to parity. In all studies, women were given the option to have additional antenatal care appointments as needed.

One RCT (Butler 2019) compared a reduced frequency antenatal care model (schedule of 8 clinic appointments, 6 virtual appointments (consisting of home blood pressure measurement, fetal heart rate testing) and access to an online prenatal care community) to the standard model of care (a schedule of 12 clinic visits).

Five studies were conducted in the US (Binstock 1995, Butler 2019, McDuffie 1996 & 1997, and Walker 1997) and 2 studies were conducted in the UK (Jewell 2000 and Sikorski 1996).

See the literature search strategy in appendix B and study selection flow chart in appendix C.

Excluded studies

Studies not included in this review with reasons for their exclusions are provided in appendix K.

Summary of clinical studies included in the evidence review

Summaries of the studies that were included in this review are presented in Table 2.

Table 2: Summary of included randomised controlled trials

Study	Population	Intervention	Comparison	Outcomes
Binstock 1995 RCT US	N=549 pregnant women Mean gestational age: 10 weeks Mean maternal age: 29 years	Reduced antenatal care schedule (8 visits)	Standard antenatal care schedule (13 visits)	• Any fetal death • Admission to hospital for treatment of adverse pregnancy outcomes • Women's experience and satisfaction of care • Admission to neonatal unit

Study	Population	Intervention	Comparison	Outcomes
Butler 2019 RCT US	N=300 pregnant women Mean gestational age: not reported Mean maternal age: 29.6 years	Reduced and altered schedule of 8 clinic appointments and 6 virtual appointments consisting of home blood pressure, fetal heart rate testing, and access to an online prenatal care community	Standard antenatal care (12 clinic visits)	• Women's experience and satisfaction of care
Jewell 2000 RCT UK	N=544 pregnant women Mean gestational age: not reported Mean maternal age: 28 years	Reduced antenatal care schedule (7 or 8 visits) Nulliparous women: minimum 8 visits Parous women: minimum 7 visits	Standard antenatal care schedule (13 visits)	• Any fetal death • Admission to hospital for treatment of adverse pregnancy outcomes • Women's experience and satisfaction of care • Admission to neonatal unit • Undiagnosed SGA
McDuffie 1996 RCT US	N=2328 pregnant women Mean gestational age: 8 weeks Mean maternal age: 28 years	Reduced antenatal care schedule (9 visits)	Standard antenatal care schedule (14 visits)	• Severe maternal morbidity up to 42 days post-birth • Any fetal death • Admission to hospital for treatment of adverse pregnancy outcomes (by cause) • Women's experience and satisfaction of care • Admission to neonatal unit • Undiagnosed SGA
McDuffie 1997 (same cohort as McDuffie 1996)	N=2328 pregnant women	Reduced antenatal care schedule (9 visits)	Standard antenatal care schedule (14 visits)	• Admission to hospital for treatment of adverse

Study	Population	Intervention	Comparison	Outcomes
RCT US	Mean gestational age: 8 weeks Mean maternal age: 28 years			pregnancy outcomes (overall)
Sikorski 1996 RCT UK	N=2794 pregnant women Mean gestational age: 13 weeks Mean maternal age: 28 years	Reduced antenatal care schedule (6 or 7 visits) Nulliparous women: 7 visits Parous women: 6 visits	Standard antenatal care schedule (13 visits)	• Severe maternal morbidity up to 42 days post-birth • Admission to hospital for treatment of adverse pregnancy outcomes • Women's experience and satisfaction of care • Admission to neonatal unit • Undiagnosed SGA
Walker 1997 RCT US	N=81 pregnant women Mean gestational age: 14 weeks Mean maternal age: 25 years	Reduced antenatal care schedule (8 visits)	Standard antenatal care schedule (14 visits)	• Admission to hospital for treatment of adverse pregnancy outcomes • Women's experience and satisfaction of care • Admission to neonatal unit • Undiagnosed SGA

RCT: randomised controlled trial; SGA: small for gestational age.

See the full evidence tables in appendix D and the forest plots in appendix E.

Quality assessment of clinical outcomes included in the evidence review

See the clinical evidence profiles in appendix F.

Economic evidence

Included studies

A systematic review of the economic literature was conducted but no economic studies were identified which were applicable to this review question.

A single economic search was undertaken for all topics included in the scope of this guideline. See supplementary material 2 for details.

Excluded studies

There was no economic evidence identified for this review question and therefore there is no excluded studies list in appendix K.

Summary of included economic evidence

No economic studies were identified which were applicable to this review question.

Economic model

No economic modelling was undertaken for this review because the committee agreed that other topics were higher priorities for economic evaluation.

Evidence statements

Clinical evidence statements

Comparison 1. Reduced antenatal appointments versus standard care antenatal appointments

Critical outcomes

Severe maternal morbidity up to 42 days post-birth

- Very low quality evidence from 2 RCTs (N=5145) showed that there is no clinically important difference between a reduced number of appointments and standard care on the number of pregnant women who experience severe maternal morbidity: RD 0.00 (95% CI -0.00 to 0.00).

Any fetal death (after 24+0 weeks)

- Very low quality evidence from 3 RCTs (N=3361) showed that there is no statistically significant difference between a reduced number of appointments and standard care on fetal death in pregnant women with uncomplicated pregnancies: Peto OR 0.97 (95% CI 0.36 to 2.60) p=0.96.

Important outcomes

Admission to hospital for treatment of adverse pregnancy outcomes

Anaemia

- Very low quality evidence from 1 RCT (N=81) showed that there is no clinically important difference between a reduced number of appointments and standard care on the number of pregnant women who experience anaemia requiring hospitalisation: RR 0.88 (95% CI 0.06 to 13.65).

Antenatal problems

- Low quality evidence from 2 RCTs (N=2605) showed that there is no clinically important difference between a reduced number of appointments and standard care on the number of pregnant women who experience antenatal problems requiring hospitalisation: RR 1.06 (95% CI 0.91 to 1.24).

Fetal malposition

- Very low quality evidence from 1 RCT (N=81) showed that there is no clinically important difference between a reduced number of appointments and standard care on the number

of pregnant women who experience fetal malposition requiring hospitalisation: RR 1.77 (95% CI 0.17 to 18.73).

Haemorrhage

- Very low quality evidence from 3 RCTs (N=5480) showed that there is no clinically important difference between a reduced number of appointments and standard care on the number of women who experience antepartum haemorrhage requiring hospitalisation: RR 1.01 (95% CI 0.77 to 1.33).
- Moderate quality evidence from 2 RCTs (N=5076) showed that there is no clinically important difference between a reduced number of appointments and standard care on the number of women who experience postpartum haemorrhage requiring hospitalisation: RR 0.99 (95% CI 0.81 to 1.22).

Hypertension

- Very low quality evidence from 4 RCTs (N=1160) showed that there is no clinically important difference between a reduced number of appointments and standard care on the number of pregnant women who experience hypertension requiring hospitalisation: RR 1.09 (95% CI 0.70 to 1.68).

Intrauterine growth restriction

- Very low quality evidence from 1 RCT (N=81) showed that there is no clinically important difference between a reduced number of appointments and standard care on the number of pregnant women who experience intrauterine growth restriction requiring hospitalisation: Peto OR 0.12 (95% CI 0.00 to 6.02).

Preeclampsia

- Low quality evidence from 2 RCTs (N=4854) showed that there is no clinically important difference between a reduced number of appointments and standard care on the number of pregnant women who experience preeclampsia requiring hospitalisation: RR 0.91 (95% CI 0.68 to 1.23).

Suspicious/abnormal cardiotocogram

- Very low quality evidence from 1 RCT (N=2402) showed that there is no clinically important difference between a reduced number of appointments and standard care on the number of pregnant women who have a suspicious/abnormal cardiotocogram requiring hospitalisation: RR 1.07 (95% CI 0.90 to 1.28).

Urinary tract infections

- Very low quality evidence from 2 RCTs (N=482) showed that there is no clinically important difference between a reduced number of appointments and standard care on the number of pregnant women who experience urinary tract infections requiring hospitalisation: Peto OR 0.30 (95% CI 0.04 to 2.14).

Preparedness for birth

No evidence was identified to inform this outcome.

Women's experience and satisfaction of antenatal care

Satisfaction with appointment arrangements

- Very low quality evidence from 1 RCT (N=331) showed that there is no clinically important difference between a reduced number of appointments and standard care on the number of pregnant women who reported satisfaction with appointment arrangements as measured by a six-point scale: MD 0.50 (95% CI 0.25 to 0.75).

Satisfaction with medical care

- Very low quality evidence from 1 RCT (N=331) showed that there is no clinically important difference between a reduced number of appointments and standard care on the number of pregnant women who reported satisfaction with medical care as measured by a six-point scale: MD 0.10 (-0.64 to 0.84).

Satisfaction with pregnancy education

- Low quality evidence from 1 RCT (N=331) showed that there is no clinically important difference between a reduced number of appointments and standard care on the number of pregnant women who reported satisfaction with pregnancy education as measured by a six-point scale: MD 0.30 (95% CI 0.07 to 0.53).

Overall satisfaction

- Low quality evidence from 1 RCT (N=1867) showed that there is no clinically important difference between a reduced number of appointments and standard care on the number of pregnant women who reported overall satisfaction as measured by a six-point scale: MD -0.20 (95% CI -0.29 to -0.11).

Satisfaction with care

- Moderate quality evidence from 1 RCT (N=267) showed that there is a clinically important difference favouring a reduced number of appointments versus standard care on the number of pregnant women who reported satisfaction with care as measured by a scale from 0 to 100: MD 15.01 (95% CI 13.38 to 16.64).

Dissatisfaction with number of visits

- Moderate quality evidence from 1 RCT (N=1873) showed that there is a clinically important difference favouring standard care versus a reduced number of appointments on the number of pregnant women who reported dissatisfaction with the number of visits as measured by a six-point scale: RR 2.01 (95% CI 1.69 to 2.38).

Satisfaction with number of visits

- Moderate quality evidence from 2 RCTs (N=1520) showed that there is a clinically important difference favouring a reduced number of appointments versus standard care on the number of pregnant women who reported number of antenatal visits as ‘slightly too many’ or ‘too many’: RR 0.14 (0.08 to 0.24).
- Moderate quality evidence from 2 RCTs (N=1520) showed that there is a clinically important difference favouring standard care versus a reduced number of appointments on the number of women who reported number of antenatal visits as ‘not quite enough’ or ‘too few’: RR 6.28 (95% CI 3.66 to 10.80).
- Very low quality evidence from 2 RCTs (N=1520) showed that there is no clinically important difference between a reduced number of appointments and standard care on the number of pregnant women who reported the number of antenatal visits as ‘slightly too many’, ‘too many’, or ‘just right’: RR 0.84 (95% CI 0.72 to 0.99).

Satisfaction of quality of care

- Low quality evidence from 1 RCT (N=1189) showed that there is no clinically important difference between a reduced number of appointments and standard care on the number of pregnant women who reported quality of care as excellent or good, as measured by a four-point scale: RR 1.00 (95% CI 0.98 to 1.01).

Satisfaction of care provision

- Low quality evidence from 1 RCT (N=466) showed that there is no clinically important difference between a reduced number of appointments and standard care on the number of pregnant women who reported they were ‘very satisfied’ with the care provided by midwives as measured by a 5-point scale: RR 0.84 (95% CI 0.73 to 0.96).
- Low quality evidence from 1 RCT (N=409) showed that there is no clinically important difference between a reduced number of appointments and standard care on the number of pregnant women who reported they were ‘very satisfied’ with the care provided by family doctors as measured by a 5-point scale: RR 0.90 (95% CI 0.73 to 1.10).
- Low quality evidence from 1 RCT (N=81) showed that there is a clinically important difference favouring a reduced number of appointments versus standard care on the number of pregnant women who reported satisfaction of care provision as measured by the Patient Satisfaction with Prenatal Care instrument: SMD -0.53 (95% CI -0.98 to -0.09).

Admission to neonatal unit

Length of stay

- Moderate quality evidence from 1 RCT (N=81) showed that there is no clinically important difference between a reduced number of appointments and standard care on the length of stay (1 day) in the neonatal unit: MD 0.00 (95% CI -1.08 to 1.08).
- Moderate quality evidence from 1 RCT (N=81) showed that there is no clinically important difference between a reduced number of appointments and standard care on the length of stay (5 and 9 days) in the neonatal unit: MD 0 (95% CI 0 to 0).
- Low quality evidence from 1 RCT (N=401) showed that there is no clinically important difference between a reduced number of appointments and standard care on the length of stay (hours) in the neonatal unit: MD 2.00 (95% CI -25.43 to 29.43).

Number of neonates

- Very low quality evidence from 4 RCTs (N=5726) showed that there is no clinically important difference between a reduced number of appointments and standard care on the number of neonates admitted to the neonatal unit: RR 1.03 (95% CI 0.79 to 1.35).

Undiagnosed small for gestational age (SGA)

- Very low quality evidence from 4 RCTs (N=5724) showed that there is no clinically important difference between a reduced number of appointments and standard care on the number of pregnant women with undiagnosed SGA: RR 1.01 (95% CI 0.88 to 1.15).

The committee's discussion of the evidence

Interpreting the evidence

The outcomes that matter most

Provision of antenatal care is important for the health and wellbeing of both mother and baby with the aim of avoiding adverse pregnancy outcomes and enhancing maternal satisfaction. The committee therefore agreed that severe maternal morbidity and fetal death were critical outcomes. Admission to hospital for the treatment of adverse pregnancy/obstetric outcomes, preparedness for birth, women's experiences and satisfaction of antenatal care, admission to neonatal unit, and undiagnosed SGA were important outcomes.

The quality of the evidence

The quality of evidence for the comparison of reduced schedule of antenatal appointments versus standard schedule of antenatal appointments ranged from very low to moderate, with most of the evidence being of a very low quality.

This was predominately due to serious overall risk of bias, resulting from high risk of performance, detection, and attrition bias, in some outcomes; serious imprecision around the effect estimate in some outcomes; and the presence of serious heterogeneity in a few outcomes, which was unresolved by sub-group analysis. For some outcomes, it was unclear whether women who experienced treatment related adverse effects were hospitalised and therefore, these outcomes were downgraded for serious indirectness.

There was no evidence identified for the outcome of preparedness for birth.

All included studies compared a reduced schedule (of six to nine visits, in one case supplemented with extra virtual appointments) with a standard antenatal care schedule (of twelve to fourteen visits). There was no evidence comparing a standard antenatal care schedule with a schedule involving more visits.

Benefits and harms

The evidence from all studies showed that there is no clinically important difference between a schedule of reduced appointments and standard care for any of the critical outcomes or any of important outcomes except satisfaction with care (see below). The committee observed that the number of appointments in the reduced schedule groups was generally aligned with the schedule of antenatal appointments recommended in the 2008 NICE guideline on antenatal care for uncomplicated pregnancies (CG62) and the standard care in the studies included more appointments than what is current practice in the UK for both nulliparous and parous women. The population in the evidence was not stratified by parity status so the reported outcomes were for a mixture of nulliparous and parous women. However, there were 2 studies that assigned parous women to a lower number of antenatal appointments than nulliparous women. Therefore, the committee agreed that the lack of evidence for a difference between the schedules supported maintaining current practice, which is planning 10 routine antenatal appointments for nulliparous women and 7 for parous women.

The committee discussed that there was no new evidence that led the committee to change from the existing recommended practice of arranging 10 appointments for nulliparous women and 7 appointments for parous women. The committee discussed that since only one study had been conducted in this research area for almost twenty years, a research recommendation should be made. The committee agreed the research recommendation should cover the effectiveness of different models of antenatal care, including the ideal number and timing of antenatal appointments, including consideration for groups at higher risk of adverse outcomes. The details of the research recommendation can be found in appendix L in evidence review F Accessing antenatal care.

The committee also observed that in all the studies, women were given the option of having additional appointments if they were necessary but that the mean number of appointments attended by the participants in these studies was not in line with the schedule of appointments that participants were assigned to. For example, in 3 of the 6 identified studies women in the reduced schedule group attended on average more appointments than actually scheduled; in the remaining 3 studies, women in the standard care group attended fewer appointments than actually scheduled.

The evidence on women's experience and satisfaction was varied. One RCT showed a clinically important difference favouring standard care over a schedule of reduced appointments (13 appointments vs 6/7 appointments, respectively) on the outcome of dissatisfaction with number of appointments (that is, more women in the reduced schedule group were dissatisfied with the number of antenatal appointments they received compared to those in the standard schedule group). By contrast, 2 RCTs showed a clinically important difference favouring a schedule of reduced appointments over standard care (respectively, 8 appointments vs 13 appointments, 9 appointments vs 14 appointments) on the number of women who indicated that they received 'slightly too many' or 'too many' appointments (that is, less women in the reduced schedule group were dissatisfied compared to those standard schedule group). Commensurate with these results, the 2 RCTs also showed a clinically important difference favouring standard care over a reduced schedule on the number of women who indicated that they received 'slightly too many' or 'too many' antenatal appointments (that is more women in the reduced schedule group were dissatisfied compared to those in standard care). One RCT reported a statistically significant difference between reduced and standard care with pregnant women in the former schedule of 8 appointments reporting greater satisfaction with care provision compared to those in the 14 appointment standard care group. Finally, one RCT reported a clinically important difference favouring reduced and altered appointments over standard care (8 clinic appointments and 6 virtual appointments vs 12 clinic appointments) on satisfaction with care.

The satisfaction with the number of appointments is likely dependent on the infrastructure around the appointments, for instance in at least one study the reduced appointments group had access to virtual appointments and a greater degree of home monitoring. The committee agreed that the variation in evidence may also be attributable to individual differences between women, where women may want more or less appointments as a function, perhaps, of parity status or other socio-demographic characteristics. For example, the committee were aware that there are studies that show women who are from disadvantaged social backgrounds and from ethnic minorities have a higher rate of adverse pregnancy outcomes and tend to attend fewer antenatal appointments. Therefore, the committee agreed that additional or longer antenatal appointments may be neededbased on the needs of the woman, including her medical, social and emotional needs. The committee then agreed to make references to various NICE guidelines which cover circumstances which may warrant additional appointments, such as NICE guideline on pregnancy and complex social factors, NICE guideline on intrapartum care for women with existing medical conditions or obstetric complications and their babies, NICE guideline on hypertension in pregnancy, NICE guideline on diabetes in pregnancy and NICE guideline on twin and triplet pregnancy

Cost effectiveness and resource use

No economic studies were identified which were applicable to this review question.

The majority of recommendations for this topic reflect current practice. The recommendation to offer flexibility in both length and total number of antenatal appointments will lead to more and longer appointments for some women. This to some degree will already be happening in all centres where medically indicated but this recommendation may lead to more appointments for those with social or emotional needs. The number of women is anticipated to be minimal and any increase resource use should be small. Some cost savings and health gains will also be achieved through improved birth outcomes from more intensive antenatal care.

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Appendices

Appendix A – Review protocols

Review protocol for review question: Is a reduced number of antenatal appointments as effective as standard care?

Table 3: Review protocol

Field (based on PRISMA-P)	Content
Review question	Is a reduced number of antenatal appointments as effective as standard care?
Type of review question	Intervention
Objective of the review	The aim of this review is to identify the minimum number of antenatal care appointments that a woman should have, and whether there are any harms associated with this number of appointments.
Eligibility criteria – population	All pregnant women
Eligibility criteria – intervention(s)	A different number of antenatal appointments compared to standard care
Eligibility criteria – comparator(s)	Standard care Note: 'Standard care' is a specific number of routine antenatal appointments as defined by the study; 'antenatal appointment' is defined as any scheduled appointment with a registered healthcare professional trained in delivering maternity care (for example, midwife, obstetrician, GP); appointments delivered by professionals such as sonographers, physiotherapists, and other clinicians not trained in delivering maternity care will be excluded. Studies that do not define how many appointments comprise 'standard care' will be excluded.

Outcomes and prioritisation	**Critical**
	• Severe maternal morbidity up to 42 days post-birth
	  ○ Admission to inpatient psychiatric services
	  ○ Admission to ITU
	  ○ Maternal death

Field (based on PRISMA-P)	Content

	• Any fetal death (after 24+0 weeks)
	  ○ Stillbirth
	  ○ Perinatal death
	Note: data for these outcomes will be pooled.
	
	Important
	• Admission to hospital for treatment of adverse pregnancy/obstetric outcomes (for example, gestational hypertension, haemorrhage)
	• Preparedness for birth
	• Women's experience and satisfaction of antenatal care
	• Admission to neonatal unit
	• Undiagnosed SGA
	
	Note: include women's experience and satisfaction with provider of care.
	Note: any measure of SGA, irrespective of chart used, will be included. SGA is defined as having a birth weight below the 10th centile. Some studies will report this as Low Birth Weight (LBW) adjusted for Gestational Age (GA) rather than as SGA.

Eligibility criteria – study design	INCLUDE: • Systematic reviews of randomised controlled trials • Randomised or quasi-randomised controlled trials (individual or cluster) For further details, see the algorithm in appendix H, Developing NICE guidelines: the manual.
Other inclusion exclusion criteria	**Exclusion** POPULATION: • Multiple pregnancy • Pregnancy with known or pre-existing congenital anomalies • Pregnant women with known medical comorbidity

Field (based on PRISMA-P)	Content
	STUDY DESIGN • Case-control studies • Cross-over studies • Cross-sectional studies • Epidemiological reviews or reviews on associations • Non-comparative studies PUBLICATION STATUS: • Conference abstract LANGUAGE: • Non-English Inclusion COUNTRY: • Only studies in high-income World Bank countries with similar centrally-funded health services will be included (for example, France). For a list of high income countries, see https://datahelpdesk.worldbank.org/knowledgebase/articles/906519-world-bank-country-and-lending-groups Note: the use of the World Bank definitions of low-, middle- and high-income countries in this guideline is consistent with its use in the Postnatal care up to 8 weeks after birth (update) NICE guideline CG37.
Proposed sensitivity/sub-group analysis, or meta-regression	Stratification by parity status (nulliparous; parous) and number of appointments comprising standard care will be conducted if required since nulliparous women have a standard 10 appointments in the UK, whilst parous women have a standard 7 appointments. Statistical heterogeneity will be assessed by visually examining the forest plots and by calculating the I2 inconsistency statistic (with an I2 value≥50% indicating serious heterogeneity, and ≥80% indicating very serious heterogeneity).
Selection process – duplicate screening/selection/analysis	Studies included in the 2008 NICE guideline on antenatal care for uncomplicated pregnancies (CG62) that satisfy the review protocol will be included in this review. Review questions selected as high priorities for health economic analysis (and those selected as medium priorities and where health economic analysis could

Field (based on PRISMA-P)	Content
	influence recommendations) will be subject to dual weeding and study selection; any discrepancies above 10% of the dual weeded resources will be resolved through discussion between the first and second reviewers or by reference to a third person. All data extraction will quality assured by a senior reviewer. Draft excluded studies and evidence tables will be circulated to the Topic Group for their comments. Resolution of disputes will be by discussion between the senior reviewer, Topic Advisor and Chair.
Data management (software)	NGA STAR software will be used for generating bibliographies/citations, study sifting and data extraction. Pairwise meta-analyses, if possible, will be performed using Cochrane Review Manager (RevMan5). For details please see supplement 1: methods. 'GRADEpro' will be used to assess the quality of evidence for each outcome.
Information sources – databases and dates	Sources to be searched: Medline, Medline In-Process, CCTR, CDSR, DARE, HTA, Embase. Limits (for example date, study design): • Date limit: 2006 (date of last search for the 2008 NICE guideline on antenatal care for uncomplicated pregnancies (CG62)) • Apply standard animal/non-English language exclusion • Limit to RCTs and systematic reviews in first instance but download all results.
Identify if an update	This antenatal care update will replace the 2008 NICE guideline on antenatal care for uncomplicated pregnancies (CG62), which will be taken down in due course. The following recommendations are on antenatal appointment timing during pregnancy from the 2008 NICE guideline on antenatal care for uncomplicated pregnancies (CG62): Antenatal appointments (schedule and content) [2008] The schedule below, which has been determined by the purpose of each appointment, presents the recommended number of antenatal care appointments for women who are healthy and whose pregnancies remain uncomplicated in the antenatal period: 10 appointments for nulliparous women and 7 for parous women. These appointments follow the woman's initial contact with a healthcare professional when she first presents with the pregnancy and from where she is referred into the maternity care system. This initial contact should be used as an opportunity to provide women with much of the information they need for pregnancy (see section 1.1.1 for recommendations on information giving). **First contact with a healthcare professional**

Field (based on PRISMA-P)	Content
	Give information (supported by written information and antenatal classes), with an opportunity to discuss issues and ask questions. Refer to section 1.1.1 for more about giving antenatal information. Topics covered should include: folic acid supplementation food hygiene, including how to reduce the risk of a food-acquired infection lifestyle advice, including smoking cessation, recreational drug use and alcohol consumption all antenatal screening, including risks and benefits of the screening tests. **Booking appointment (ideally by 10 weeks)** At the booking appointment, give the following information (supported by written information and antenatal classes), with an opportunity to discuss issues and ask questions. Refer to section 1.1.1 for more about giving antenatal information. Topics covered should include: • how the baby develops during pregnancy • nutrition and diet, including vitamin D supplementation • exercise, including pelvic floor exercises • antenatal screening, including risks and benefits of the screening tests • pregnancy care pathway • place of birth (refer to 'Intrapartum care' [NICE clinical guideline 55]) • breastfeeding, including workshops • participant-led antenatal classes • maternity benefits. At this appointment: • identify women who may need additional care (see appendix C) and plan pattern of care for the pregnancy • check blood group and rhesus D status • offer screening for haemoglobinopathies, anaemia, red-cell alloantibodies, hepatitis B virus, HIV, rubella susceptibility and syphilis

Field (based on PRISMA-P)	Content

	• offer screening for asymptomatic bacteriuria inform pregnant women younger than 25 years about the high prevalence of chlamydia infection in their age group, and give details of their local National Chlamydia Screening Programme
	• offering screening for Down's syndrome
	• offer early ultrasound scan for gestational age assessment
	• offer ultrasound screening for structural anomalies
	• measure height, weight and calculate body mass index
	• measure blood pressure and test urine for proteinuria
	• offer screening for gestational diabetes and pre-eclampsia using risk factors
	• identify women who have had genital mutilation
	• ask about any past or present severe mental illness or psychiatric treatment
	• ask about mood to identify possible depression
	• ask about the woman's occupation to identify potential risks
	At the booking appointment, for women who choose to have screening, the following tests should be arranged:
	• blood tests (for checking blood group and rhesus D status and screening for haemoglobinopathies, anaemia, red-cell alloantibodies, hepatitis B virus, HIV, rubella susceptibility and syphilis), ideally before 10 weeks
	• urine tests (to check for proteinuria and screen for asymptomatic bacteriuria)
	• ultrasound scan to determine gestational age using:
	  ○ crown–rump measurement between 10 weeks 0 days and 13 weeks 6 days
	  ○ head circumference if crown–rump length is above 84 millimetres
	• Down's syndrome screening using:
	  ○ 'combined test' at 11 weeks 0 days to 13 weeks 6 days
	  ○ serum screening test (triple or quadruple) at 15 weeks 0 days to 20 weeks 0 days.
	• ultrasound screening for structural anomalies, normally between 18 weeks 0 days and 20 weeks 6 days.
	
	16 weeks

Field (based on PRISMA-P)	Content
	The next appointment should be scheduled at 16 weeks to: • review, discuss and record the results of all screening tests undertaken; reassess planned pattern of care for the pregnancy and identify women who need additional care • investigate a haemoglobin level below 11 g/100 ml and consider iron supplementation if indicated • measure blood pressure and test urine for proteinuria • give information, with an opportunity to discuss issues and ask questions, including discussion of the routine anomaly scan; offer verbal information supported by antenatal classes and written information. **18 to 20 weeks** At 18 to 20 weeks, if the woman chooses, an ultrasound scan should be performed for the detection of structural anomalies. For a woman whose placenta is found to extend across the internal cervical os at this time, another scan at 32 weeks should be offered. **25 weeks** At 25 weeks, another appointment should be scheduled for nulliparous women. At this appointment: • measure and plot symphysis–fundal height • measure blood pressure and test urine for proteinuria • give information, with an opportunity to discuss issues and ask questions; offer verbal information supported by antenatal classes and written information. **28 weeks** The next appointment for all pregnant women should occur at 28 weeks. At this appointment: • offer a second screening for anaemia and atypical red-cell alloantibodies • investigate a haemoglobin level below 10.5 g/100 ml and consider iron supplementation, if indicated • offer anti-D prophylaxis to rhesus-negative women • measure blood pressure and test urine for proteinuria • measure and plot symphysis–fundal height

Field (based on PRISMA-P)	Content
	• give information, with an opportunity to discuss issues and ask questions; offer verbal information supported by antenatal classes and written information. **31 weeks** Nulliparous women should have an appointment scheduled at 31 weeks to: • measure blood pressure and test urine for proteinuria • measure and plot symphysis–fundal height • give information, with an opportunity to discuss issues and ask questions; offer verbal information supported by antenatal classes and written information review, discuss and record the results of screening tests undertaken at 28 weeks; reassess planned pattern of care for the pregnancy and identify women who need additional care. **34 weeks** At 34 weeks, all pregnant women should be seen again. Give information (supported by written information and antenatal classes), with an opportunity to discuss issues and ask questions. Refer to section 1.1.1 for more about giving antenatal information. Topics covered should include: • preparation for labour and birth, including information about coping with pain in labour and the birth plan • recognition of active labour. At this appointment: • offer a second dose of anti-D to rhesus-negative women • measure blood pressure and test urine for proteinuria • measure and plot symphysis–fundal height • give information, with an opportunity to discuss issues and ask questions; offer verbal information supported by antenatal classes and written information • review, discuss and record the results of screening tests undertaken at 28 weeks; reassess planned pattern of care for the pregnancy and identify women who need additional care. **36 weeks**

Field (based on PRISMA-P)	Content
	At the 36-week appointment, all pregnant women should be seen again. Give the following information (supported by written information and antenatal classes), with an opportunity to discuss issues and ask questions. Refer to section 1.1.1 for more about giving antenatal information. Topics covered should include: • breastfeeding information, including technique and good management practices that would help a woman succeed, such as detailed in the UNICEF Baby Friendly Initiative • care of the new baby • vitamin K prophylaxis and newborn screening tests • postnatal self-care awareness of 'baby blues' and postnatal depression. • At this appointment: • measure blood pressure and test urine for proteinuria • measure and plot symphysis–fundal height • check position of baby • for women whose babies are in the breech presentation, offer external cephalic version (ECV) **38 weeks** Another appointment at 38 weeks will allow for: • measurement of blood pressure and urine testing for proteinuria • measurement and plotting of symphysis–fundal height • information giving, including options for management of prolonged pregnancy, with an opportunity to discuss issues and ask questions; verbal information supported by antenatal classes and written information. **40 weeks** For nulliparous women, an appointment at 40 weeks should be scheduled to: • measure blood pressure and test urine for proteinuria • measure and plot symphysis–fundal height

Field (based on PRISMA-P)	Content
	• give information, including further discussion about the options for prolonged pregnancy, with an opportunity to discuss issues and ask questions; offer verbal information supported by antenatal classes and written information. **41 weeks** For women who have not given birth by 41 weeks: • a membrane sweep should be offered • induction of labour should be offered • blood pressure should be measured and urine tested for proteinuria • symphysis–fundal height should be measured and plotted • information should be given, with an opportunity to discuss issues and ask questions; verbal information supported by written information. **General** Throughout the entire antenatal period, healthcare providers should remain alert to risk factors, signs or symptoms of conditions that may affect the health of the mother and baby, such as domestic violence, pre-eclampsia and diabetes (refer to diabetes in pregnancy NICE guideline CG63).
Author contacts	Developer: National Guideline Alliance.
Highlight if amendment to previous protocol	For details please see section 4.5 of Developing NICE guidelines: the manual.
Search strategy – for one database	For details please see appendix B.
Data collection process – forms/duplicate	A standardised evidence table format will be used, and published as appendix D (clinical evidence tables) or H (economic evidence tables).
Data items – define all variables to be collected	For details please see evidence tables in appendix D (clinical evidence tables) or H (economic evidence tables).
Methods for assessing bias at outcome/study level	Quality assessment of individual studies will be performed using the following checklists: • ROBIS tool for systematic reviews • Cochrane RoB tool v.2 for RCTs or quasi-RCTs

Field (based on PRISMA-P)	Content
	• Cochrane ROBINS-I for non-randomised controlled trials and cohort studies. For details please see section 6.2 of Developing NICE guidelines: the manual. The risk of bias across all available evidence will be evaluated for each outcome using an adaptation of the 'Grading of Recommendations Assessment, Development and Evaluation (GRADE) toolbox' developed by the international GRADE working group: http://www.gradeworkinggroup.org/
Criteria for quantitative synthesis (where suitable)	For details please see section 6.4 of Developing NICE guidelines: the manual.
Methods for analysis – combining studies and exploring (in)consistency	For details please see supplement 1: methods.
Meta-bias assessment – publication bias, selective reporting bias	For details please see supplement 1: methods and section 6.2 of Developing NICE guidelines: the manual. If sufficient relevant RCT evidence is available, publication bias will be explored using RevMan software to examine funnel plots. Trial registries will be examined to identify missing evidence: Clinical trials.gov, NIHR Clinical Trials Gateway.
Assessment of confidence in cumulative evidence	For details please see sections 6.4 and 9.1 of Developing NICE guidelines: the manual.
Rationale/context – Current management	For details please see the introduction to the evidence review.
Describe contributions of authors and guarantor	A multidisciplinary committee developed the guideline. The committee was convened by the National Guideline Alliance and chaired by Kate Harding in line with section 3 of Developing NICE guidelines: the manual. Staff from the National Guideline Alliance undertook systematic literature searches, appraised the evidence, conducted meta-analysis and cost-effectiveness analysis where appropriate, and drafted the guideline in collaboration with the committee. For details please see supplement 1: methods.
Sources of funding/support	The National Guideline Alliance is funded by NICE and hosted by the Royal College of Obstetricians and Gynaecologists.
Name of sponsor	The National Guideline Alliance is funded by NICE and hosted by the Royal College of Obstetricians and Gynaecologists.
Roles of sponsor	NICE funds the National Guideline Alliance to develop guidelines for those working in the NHS, public health, and social care in England.
PROSPERO registration number	This protocol is not registered with PROSPERO.

1 *CCTR: Cochrane Controlled Trials Register; CDSR: Cochrane Database of Systematic Reviews; CENTRAL: Cochrane Central Register of Controlled Trials; DARE: Database*
2 *of Abstracts of Reviews of Effects; GA: gestational age; GRADE: Grading of Recommendations Assessment, Development and Evaluation; HTA: Health Technology*

Assessment; ITU, intensive treatment unit; NGA: National Guideline Alliance; NICE: National Institute for Health and Care Excellence; NIHR: National Institute for Health Research; RCT(s): randomised controlled trial(s); RoB: risk of bias; ROBIS: Risk Of Bias In Systematic reviews tool; ROBINS-I: Risk Of Bias In Non-randomized studies – of Interventions tool; SGA: small for gestational age.

Appendix B – Literature search strategies

Literature search strategies for review question: Is a reduced number of antenatal appointments as effective as standard care?

This was a combined search to cover both this review (evidence review I) and also evidence review H.

Database(s): Medline & Embase (Multifile)
Last searched on **Embase Classic+Embase** 1947 to 2020 September 04, **Ovid MEDLINE(R) and Epub Ahead of Print, In-Process & Other Non-Indexed Citations and Daily** 1946 to September 04, 2020
Date of last search: 8th September 2020
Multifile database codes: emczd = Embase Classic+Embase; ppez= MEDLINE(R) and Epub Ahead of Print, In-Process & Other Non-Indexed Citations and Daily

#	Searches
1	(Pregnancy/ or Pregnant Women/) use ppez
2	(pregnancy/ or pregnant woman/) use emczd
3	(Prenatal Care/ or Prenatal Diagnosis/) use ppez
4	(prenatal care/ or prenatal diagnosis/) use emczd
5	(antenatal$ or ante-natal$ or ante natal$ or prenatal$ or pre-natal$ or pre natal$ or pregnan$).tw.
6	1 or 2 or 3 or 4 or 5
7	"Appointments and Schedules"/ use ppez
8	Office Visits/ use ppez
9	ambulatory care/ use emczd
10	hospital management/ use emczd
11	((antenatal$ or ante-natal$ or prenatal or pre-natal$) adj care adj (booking$ or visit$ or appointment$)).tw.
12	((antenatal$ or ante-natal$ or ANC or prenatal$ or pre-natal$ or midwi$) adj (booking$ or visit$ or appointment$)).tw.
13	7 or 8 or 9 or 10 or 11 or 12
14	Time Factors/ use ppez
15	time factor/ use emczd
16	((visit$ or standard or traditional) adj3 schedule$).tw.
17	((number or timing or frequency or fewer or less or lower or reduc$ or more or increas$) adj5 (booking$ or visit$ or appointment$)).tw.
18	((timing or frequency or utilis$ or utiliz$) adj3 (antenatal care or ante-natal care or ANC)).tw.
19	14 or 15 or 16 or 17 or 18
20	6 and 13 and 19
21	(controlled clinical trial or pragmatic clinical trial or randomized controlled trial).pt. or drug therapy.fs. or (groups or placebo or randomi#ed or randomly or trial).ab.
22	crossover procedure/ or double blind procedure/ or randomized controlled trial/ or single blind procedure/ or (assign* or allocat* or crossover* or cross over* or ((doubl* or singl*) adj blind*) or factorial* or placebo* or random* or volunteer*).ti,ab.
23	meta-analysis/
24	meta-analysis as topic/
25	systematic review/
26	meta-analysis/
27	(meta analy* or metanaly* or metaanaly*).ti,ab.
28	((systematic or evidence) adj2 (review* or overview*)).ti,ab.
29	((systematic* or evidence*) adj2 (review* or overview*)).ti,ab.
30	(reference list* or bibliograph* or hand search* or manual search* or relevant journals).ab.
31	(search strategy or search criteria or systematic search or study selection or data extraction).ab.
32	(search* adj4 literature).ab.
33	(medline or pubmed or cochrane or embase or psychlit or psyclit or psychinfo or psycinfo or cinahl or science citation index or bids or cancerlit).ab.
34	cochrane.jw.
35	((pool* or combined) adj2 (data or trials or studies or results)).ab.
36	letter/
37	editorial/
38	news/
39	exp historical article/
40	Anecdotes as Topic/
41	comment/
42	case report/

#	Searches
43	(letter or comment*).ti.
44	36 or 37 or 38 or 39 or 40 or 41 or 42 or 43
45	randomized controlled trial/ or random*.ti,ab.
46	44 not 45
47	animals/ not humans/
48	exp Animals, Laboratory/
49	exp Animal Experimentation/
50	exp Models, Animal/
51	exp Rodentia/
52	(rat or rats or mouse or mice).ti.
53	46 or 47 or 48 or 49 or 50 or 51 or 52
54	letter.pt. or letter/
55	note.pt.
56	editorial.pt.
57	case report/ or case study/
58	(letter or comment*).ti.
59	54 or 55 or 56 or 57 or 58
60	randomized controlled trial/ or random*.ti,ab.
61	59 not 60
62	animal/ not human/
63	nonhuman/
64	exp Animal Experiment/
65	exp Experimental Animal/
66	animal model/
67	exp Rodent/
68	(rat or rats or mouse or mice).ti.
69	61 or 62 or 63 or 64 or 65 or 66 or 67 or 68
70	53 use ppez
71	69 use emczd
72	70 or 71
73	21 use ppez
74	22 use emczd
75	73 or 74
76	(or/23-24,27,29-34) use ppez
77	(or/25-28,30-35) use emczd
78	76 or 77
79	20 and 72
80	20 not 79
81	((early or late or initial or first) adj (antenatal$ or ante-natal$ or ANC or prenatal$ or pre-natal$ or midwi$) adj (booking$ or visit$ or appointment$)).tw.
82	72 and 81
83	81 not 82
84	80 or 83
85	limit 84 to english language
86	limit 85 to yr="1995 -Current"
87	75 or 78
88	86 and 87 [RCT/SR data]
89	86 not 88 [Non-RCT/SR data]

Database(s): Cochrane Library
Last searched on **Cochrane Database of Systematic Reviews**, Issue 9 of 12, September 2020, **Cochrane Central Register of Controlled Trials**, Issue 9 of 12, September 2020
Date of last search: 8th September 2020

#	Searches
#1	MeSH descriptor: [Pregnancy] this term only
#2	MeSH descriptor: [Pregnant Women] this term only
#3	MeSH descriptor: [Prenatal Care] this term only
#4	MeSH descriptor: [Prenatal Diagnosis] this term only
#5	((antenatal* or ante-natal* or ante natal* or prenatal* or pre-natal* or pre natal* or pregnan*)):ti,ab,kw
#6	#1 OR #2 OR #3 OR #4 OR #5
#7	MeSH descriptor: [Appointments and Schedules] this term only
#8	MeSH descriptor: [Office Visits] this term only
#9	(((antenatal* or ante-natal* or prenatal or pre-natal*) NEXT care NEXT (booking* or visit* or appointment*))):ti,ab,kw
#10	((antenatal* or ante-natal* or ANC or prenatal* or pre-natal* or midwi*) NEXT (booking* or visit* or appointment*))
#11	#7 OR #8 OR #9 OR #10
#12	MeSH descriptor: [Time Factors] this term only

#	Searches
#13	(((visit* or standard or traditional) NEAR/3 schedule*)):ti,ab,kw
#14	(((number or timing or frequency or fewer or less or lower or reduc* or more or increas*) NEAR/5 (booking* or visit* or appointment*))):ti,ab,kw
#15	(((timing or frequency or utilis* or utiliz*) NEAR/3 (antenatal care or ante-natal care or ANC))):ti,ab,kw
#16	#12 OR #13 OR #14 OR #15
#17	#6 AND #11 AND #16
#18	(((early or late or initial or first) NEXT (antenatal* or ante-natal* or ANC or prenatal* or pre-natal* or midwi*) NEXT (booking* or visit* or appointment*))):ti,ab,kw
#19	#17 OR #18

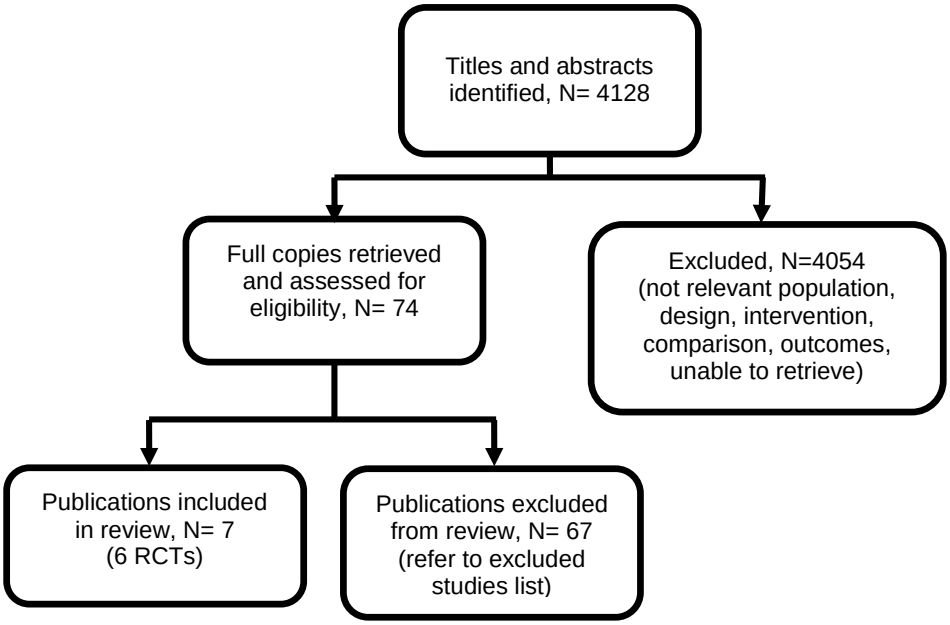
Database(s): CRD: Database of Abstracts of Reviews of Effects (DARE), HTA Database
Date of last search: 8th September 2020

#	Searches
1	MeSH DESCRIPTOR pregnancy EXPLODE ALL TREES IN DARE,HTA
2	MeSH DESCRIPTOR pregnant women EXPLODE ALL TREES IN DARE,HTA
3	MeSH DESCRIPTOR prenatal care EXPLODE ALL TREES IN DARE,HTA
4	MeSH DESCRIPTOR prenatal diagnosis EXPLODE ALL TREES IN DARE,HTA
5	((antenatal* or ante-natal* or ante natal* or prenatal* or pre-natal* or pre natal* or pregnan*)) IN DARE, HTA
6	#1 OR #2 OR #3 OR #4 OR #5
7	MeSH DESCRIPTOR appointments and schedules EXPLODE ALL TREES IN DARE,HTA
8	MeSH DESCRIPTOR Office Visits EXPLODE ALL TREES IN DARE,HTA
9	((((antenatal* or ante-natal* or prenatal or pre-natal*) NEAR care NEAR (booking* or visit* or appointment*)))) IN DARE, HTA
10	(((antenatal* or ante-natal* or ANC or prenatal* or pre-natal* or midwi*) NEAR (booking* or visit* or appointment*))) IN DARE, HTA
11	#7 OR #8 OR #9 OR #10
12	MeSH DESCRIPTOR Time Factors EXPLODE ALL TREES IN DARE,HTA
13	((((visit* or standard or traditional) NEAR schedule*))) IN DARE, HTA
14	((((number or timing or frequency or fewer or less or lower or reduc* or more or increas*) NEAR (booking* or visit* or appointment*)))) IN DARE, HTA
15	((((timing or frequency or utilis* or utiliz*) NEAR (antenatal care or ante-natal care or ANC)))) IN DARE, HTA
16	#12 OR #13 OR #14 OR #15
17	#6 AND #11 AND #16
18	((((early or late or initial or first) NEAR (antenatal* or ante-natal* or ANC or prenatal* or pre-natal* or midwi*) NEAR (booking* or visit* or appointment*)))) IN DARE, HTA
19	#17 OR #18

Appendix C – Clinical evidence study selection

Clinical study selection for: Is a reduced number of antenatal appointments as effective as standard care?

Figure 1: Study selection flow chart



Appendix D – Clinical evidence tables

Clinical evidence tables for review question: Is a reduced number of antenatal appointments as effective as standard care?

Table 4: Clinical evidence tables

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Full citation Binstock, M. A., Wolde-Tsadik, G., Alternative prenatal care: Impact of reduced visit frequency, focused visits and continuity of care, Journal of Reproductive Medicine for the Obstetrician and Gynecologist, 40, 507-512, 1995 **Ref Id** 824893 **Country/ies where the study was carried out** US **Study type** Randomised controlled trial. **Aim of the study** To investigate the impact of an alternative	**Sample size** N=697 (N=549 analysed) (n=148 lost to follow-up) Study group: n=320 (n=227 analysed) (n=93 lost to follow-up) Control group: n=229 (n=174 analysed) (n=55 lost to follow-up) **Characteristics** <u>Average patient age- mean±SD:</u> Study group: 29.8±5.2 Control group: 28.9±4.7 <u>Parity- mean±SD:</u> Study group: 0.8±0.9 Control group: 0.7±0.8 <u>Nulliparous- %:</u> Study group: 45% Control group: 49% <u>Prior miscarriages- mean±SD:</u> Study group: 0.3±0.6 Control group: 0.2±0.4 <u>Mean gestational age at the time of first visit (weeks)- mean±SD:</u> Study group: 10.5±2.8 Control group: 10.9±2.6 **Inclusion criteria** All women who were <18 weeks' gestational age at the time of	**Interventions** Study group received (on average) 8 visits, all of them with one study provider. The visit schedule was an initial visit followed by visits at 16, 24, 30, 34, 36, 38, and 40 weeks, and then weekly thereafter. Control group received (on average) 13 visits with different providers, according to standard care. Each visit had focused content, where the patient was given an educational handout targeted to that particular gestational age.	**Details** **Power analysis** Not stated. **Statistical analyses** Univariate comparisons were performed using the chi-squared or Fisher's exact test for categorical data and Student's t test for continuous variables. In the latter case, if assumptions of normality could not be met, the rank sum test was used. In the multivariate analyses, generalised linear model methods (analysis of covariance, logistic and linear regression) were employed. All tests were two-tailed and performed at a significance level of 0.05. **Intention-to-treat (ITT) analysis** Not stated.	**Results** **Fetal death** Study group: 0% Control group: 0.6% p=0.43 **Admission to hospital for treatment of adverse pregnancy/obstetric outcomes** <u>*Pregnancy induced hypertension (%):</u> Study group: 4% Control group: 2.3% p=0.41 <u>*Pyelonephritis (%):</u> Study group: 0% Control group: 1.2% p=0.19 <u>*Third trimester bleeding (%):</u> Study group: 2.2% Control group: 2.3% p=0.99 *not specified whether these adverse events required hospitalisation. **Women's experience and satisfaction of antenatal care** Study group: n=185 Control group: 146	**Limitations** **Cochrane risk of bias tool V2:** <u>Randomisation process:</u> High risk. (Patients were allocated to the study or control group on the basis of their birth dates). <u>Deviations from intended interventions (assignment):</u> High risk. (Patients and clinicians knew which study protocol was used. Blinding of participants and personnel was not feasible for this study). <u>Missing outcome data:</u> High risk. (148 women (21%) lost to follow-up overall. More participants lost in intervention group compared to control group).

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
prenatal care program for low-risk patients. **Study dates** 1990-1992 **Source of funding** Not mentioned.	registration and without evidence of a high risk condition were eligible to volunteer. **Exclusion criteria** Not mentioned.			Overall satisfaction with prenatal care- mean (scale of 1-10) Study group: 8.3 Control group: 8.4 p= not significant Satisfaction regarding number of prenatal visits- % Study group: Way too few- 2% Not quite enough-25% About right- 71% Slightly too many- 2% Way too many- 0% Control group: Way too few- 1% Not quite enough- 5% About right- 84% Slightly too many- 10% Way too many- 0% p<0.0001 Satisfaction regarding the number of different providers seen Study group: Very satisfied- 74% Satisfied- 22% Somewhat dissatisfied- 3% Very dissatisfied- 2% Control group: Very satisfied- 48% Satisfied- 33% Somewhat dissatisfied- 21% Very dissatisfied- 4% p<0.0001 Satisfaction with pregnancy education- mean±SD (scale from 1 to 6, where 6 is highest satisfaction) Study group: 5.2±1.0 Control group: 4.9±1.1 p=0.016	Measurement of the outcome: High risk. (Outcomes were recorded by staff aware of group allocation). Selection of the reported result: Some concerns. (Assessment from published study report). Other bias: High risk. (Multiple changes introduced in the control and study groups so it is difficult to identify which variable affected the outcome; patients were aware of the study protocol which might have incentivised participants and patient satisfaction could've been affected by selection bias). Overall risk: High risk **Other information** A slight difference was observed between average gravidity between the control and study

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
				Satisfaction with appointment arrangements- mean±SD (scale from 1 to 6, where 6 is highest satisfaction) Study group: 5.0±1.1 Control group: 4.5±1.2 p<0.0001 **Admission to neonatal unit** Neonatal length of stay (hours) mean±SD Study group: 54±126 Control group: 52±148 p= not significant	groups (2.3 vs. 2.7, p=0.38). Significant differences in the number of prenatal visits and prenatal care minutes, continuity index and discontinuity index were observed between the two groups.
Full citation Butler Tobah, Y. S., LeBlanc, A., Branda, M. E., Inselman, J. W., Morris, M. A., Ridgeway, J. L., Finnie, D. M., Theiler, R., Torbenson, V. E., Brodrick, E. M., Meylor de Mooij, M., Gostout, B., Famuyide, A., Randomized comparison of a reduced-visit prenatal care model enhanced with remote monitoring, American Journal of Obstetrics & GynecologyAm J Obstet Gynecol, 221, 638.e1-638.e8, 2019 **Ref Id**	**Sample size** N=300 (N=267 analysed) Intervention: n=150 (n=134 analysed) Control: n=150 (n=133 analysed) **Characteristics** Maternal age (years)- Mean (SD) Intervention: 29.5±3.3 Control: 29.7±3.6 Mean body mass index- Mean (SD) Intervention: 25.3±5.4 Control: 26.0±6.7 Gravida of 1- Number (%) Intervention: 48/150 (32) Control: 50/150 (33.3) Parity of 1- Number (%) Intervention: 90/150 (60) Control: 89/150 (59.3)	**Interventions** Intervention (OB Nest): 8 scheduled clinic appointments + 6 virtual (phone or online) appointments consisting of: • home blood pressure and fetal heart rate evaluation; • gestational age appropriate anticipatory guidance per ACOG recommendations; • additional nursing education, based on patient's individual needs; • home digital sphygmomanometer and handheld fetal Doppler; • access to an online prenatal care community.	**Details** **Power analysis** A 2-sided alpha level of 0.05, it was estimated that a sample size of 270 (135/arm) would have 98% power to detect a difference of 7 points, based on a standard deviation of 14.4,16 with 10% attrition. **Statistical analyses** Fisher exact test statistic was used for categorical outcomes and t test for continuous outcomes. **Intention-to-treat analysis** A modified ITT analysis was used to	**Results** **Women's experience and satisfaction of antenatal care** Satisfaction with care (0-100, 100=highly satisfied) Intervention: 93.90±7.02 Control: 78.89±6.58 Mean difference (95% CI): 15.01 (13.38 to -16.64) p <0.01	**Limitations** **Cochrane risk of bias tool V2:** Randomisation process: Low risk. (Allocation concealed. No baseline differences) Deviations from intended interventions (assignment): Some concerns. (Participants aware of assignment. No information on deviations. Appropriate analysis). Missing outcome data: High risk. (11% participant loss due

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
1172522 **Country/ies where the study was carried out** US **Study type** Randomised controlled trial **Aim of the study** To evaluate the acceptability and effectiveness of OB Nest, a reduced-frequency prenatal care model enhanced with remote home monitoring devices and nursing support **Study dates** March 2014 to January 2015 **Source of funding** Obstetrics Division at Mayo Clinic with support from the Mayo Clinic Robert D. and Patricia E. Kern Center for the Science of Health Care Delivery.	**Inclusion criteria** • English-speaking pregnant women between 18 to 36 years old; • At <13 weeks of gestation; • Without a concurrent medical or obstetric complication; • Had the ability to provide informed consent **Exclusion criteria** • Diagnoses of any chronic medical conditions, including hypertensive disorders, coagulopathies, diabetes, class 3 obesity, immunodeficiency conditions, genetic disorders, multi-fetal gestation, prior history or risk factors for preterm delivery, pulmonary disorders, unstable mental health conditions, or obstetrician judgment that determined the pregnancy was at high risk for complications.	Control: 12 clinic appointments with an obstetrician or a certified nurse midwife *Participants, nurses, or clinicians could at any point request further appointments or phone visits if deemed clinically necessary.	account for participants who were randomised but subsequently became ineligible, prior to the start of the intervention.		to discontinuation. Equal loss from both arms.) Measurement of the outcome: Some concerns. (Outcome data was assessed on a subjective scale, through self-reported data). Selection of the reported result: Low risk. (Clinical trial registration reported) Other biases: Low risk. (No other bias suspected) Overall bias: Some concerns

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Full citation Jewell, D., Sharp, D., Sanders, J., Peters, T. J., A randomised controlled trial of flexibility in routine antenatal care, British journal of obstetrics and gynaecology, 107, 1241-1247, 2000 **Ref Id** 994512 **Country/ies where the study was carried out** UK **Study type** Randomised controlled trial. **Aim of the study** To assess changes in satisfaction associated with a flexible approach to antenatal care schedules offered to women at low obstetric risk. **Study dates**	**Sample size** N=609 (N=544 analysed) Study group: n=309 (n=265 analysed) Control group: n=300 (n=279 analysed) **Characteristics** Age (years)- mean Study group: 28.2 Control group: 28.0 Nulliparous- % Study group: 51.6% Control group: 48.4% **Inclusion criteria** • Pregnant women booking for antenatal care, who are at low risk of obstetric complications. **Exclusion criteria** • Previous stillbirth or neonatal death; • Previous preterm birth (<37 weeks of gestation); • Previous baby born with birth weight lower than 2.5kg;	**Interventions** Study group: **flexible schedule of antenatal visits for nulliparous women**: see at least every 8 weeks from booking until 32 weeks, and then see at least every 2 weeks from 33 weeks until delivery. **Flexible schedule for parous women**: see at least every 8 weeks from booking until 32 weeks, then see at least every 3 weeks from 33 weeks until delivery. Control group: traditional schedule of antenatal visits. See monthly until 28 weeks, then every 2 weeks until 36 weeks, then every week until delivery.	**Details** **Power analysis** The sample size of the trial was calculated to provide 80% power to detect, with a 5% two-sided significance level, a 15% increase in the proportion of women satisfied with their antenatal care. The same size required to detect such a change was 500 women, 250 in each arm. Assuming a loss of 15%, it was estimated that 600 women would need to be recruited into this study. **Statistical analyses** All women were analysed according to the group to which they were assigned. The following tests were used: chi-squared test for categorical variables; unpaired t test for continuous variables; and the Wilcoxon rank sum test where parametric tests were not suitable. A 5% level of significance was chosen for	**Results** **Any fetal death (after 24+0 weeks)** Study group: n=3 Control group: n=2 **Admission to hospital for treatment of adverse pregnancy/obstetric outcomes** Hypertensive disorders of pregnancy- treated with anti-hypertensives- % Study group: 1.5% Control group: 1.1% p=0.88 *Antenatal problems - number (%): Study group: 107/140 (76%) Control group: 102/137 (74%) p=0.70 *Not clear whether women were referred to hospital for this. **Women's experience and satisfaction of antenatal care** Overall satisfaction with care provided by midwives (reported 'very satisfied' on a 5-point scale)- n/n total (%) Study group: 135/224 (60%) Control group: 174/242 (72%) p=0.01 Overall satisfaction with care provided by family doctors	**Limitations** **Cochrane risk of bias tool V2:** Randomisation process: Low risk. (Randomisation involved blocks of 20 women within strata, generated by an individual not involved in patient recruitment. Randomisation was performed by telephone stratifying by parity and by stage of gestation at time of booking). Deviations from intended interventions (assignment): High risk. (Allocation of schedule known to both participant and personnel since a label with description of schedule was attached to the front of the patient-held maternity record). Missing outcome data: High risk. (65 women (11%) lost to follow-up in both arms. Unequal loss in

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
1996-1997 **Source of funding** A grant from the South West Research and Development Directorate.	• Severe pregnancy induced hypertension; • Woman's mother having a history of severe pregnancy induced hypertension (nulliparous women only); • Severe medical condition in current pregnancy; • Addiction to controlled drugs; • Recurrent (3 or more consecutive) miscarriages.		primary outcomes (95% CI calculated), and a 1% level of significance was chosen for secondary outcomes (99% CI calculated). **Intention-to-treat (ITT) analysis** A strict ITT analysis was not possible with some women lost in the course of the study.	(reported 'very satisfied' on a 5-point scale)- n/n total (%) Study group: 90/196 (42%) Control group: 109/213 (51%) p=0.76 Overall satisfaction with care provided by hospital (reported 'very satisfied' on a 5-point scale)- n/n total (%) Study group: 36/86 (42%) Control group: 50/88 (54%) p=0.18 **Admission to neonatal unit** Study group: 5.3% (n=264) Control group: 6.1% (n=277) p=0.68 **Undiagnosed small for gestational age** Suspected small for gestational age (%): Study group: 8.3% Control group: 3.9% p=0.033	intervention arm (14%) versus control arm (7%)). Measurement of the outcome: High risk. (Outcomes were recorded by staff aware of group allocation). Selection of the reported result: Some concerns. (Assessment from published study report). Other bias: Low risk. (No other bias suspected). Overall bias: High risk
Full citation McDuffie Jr, R. S., Beck, A., Bischoff, K., Cross, J., Orleans, M., Effect of frequency of prenatal care visits on perinatal outcome among low-risk women: A randomized controlled trial, Journal of the American medical association, 275, 847-851, 1996	**Sample size** N=2764 (N=2328 analysed) Study group: n=1382 (n=1165 analysed) Control group: n=1382 (n=1163 analysed) **Characteristics** Maternal age at enrolment (years)- mean±SD: Study group: 28.5±4.9 Control group: 28.5±4.8	**Interventions** Study group: Visits at 8, 12, 16, 24, 28, 32, 36, 38, and 40 weeks (9 visits). For parous women, a telephone call was scheduled at 12 weeks instead of a visit. Control group: Visits every 4 weeks from 8 to 28 weeks, every 2 weeks until 36 weeks, and weekly thereafter (14 visits).	**Details** Not all women presented exactly at 8 weeks gestation. Women at 7 or 8 weeks were seen according to schedule, but women at 9 or 10 weeks were asked to return at 14 weeks, and have their blood drawn at 16 weeks. Women at 11 or 12	**Results** **Severe maternal morbidity up to 42 days post birth** Maternal mortality- number: Study group: 0/1175 Control group: 0/1176 p=1.00 **Any fetal death (after 24+0 weeks)** Stillbirth- number (%) Study group: 5 (0.4%) Control group: 5 (0.4%) p=0.50	**Limitations** **Cochrane risk of bias tool V2:** Randomisation process: Low risk. (Table of random numbers). Deviations from intended interventions (assignment): Some concerns. (Sealed opaque

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Ref Id 994560 **Country/ies where the study was carried out** US **Study type** Randomised controlled trial. **Aim of the study** To test whether there is a significant increase in adverse perinatal outcomes when low-risk women are seen in a prenatal care visit schedule or fewer visits than routinely advised. **Study dates** 1992-1994 **Source of funding** This study was supported by grant 1019077 from the Sidney Garfield Memorial Fund.	p=0.86 Nulliparity (number)- % Study group: 543 (46.6%) Control group: 587 (50.5%) p=0.06 Gestational age at enrolment (weeks)- mean±SD: Study group: 8.6±1.7 Control group: 8.6±1.6 p=0.29 **Inclusion criteria** • Women in their first trimester of pregnancy. **Exclusion criteria** • Younger than 18 years or older than 39 years of age; • If they had completed 13 weeks of gestation; • If they had a past or current high-risk obstetrical condition; • If they had a current medical condition; • If they were non-English speaking; • If they were planning to change insurance carriers during the pregnancy.		weeks returned for their next visits at 16 weeks. **Power analysis** The required sample size was calculated based on an anticipated rate of preterm birth of 5.5%. A sample was chosen that was large enough to detect 2.5% increase in preterm birth over the baseline rate. To achieve 80% power, a total of 2426 participants (1213 in each group) were required. Assuming a 10% spontaneous abortion rate, the sample size was adjusted accordingly to 2669. **Statistical analyses** Categorical data were analysed by the chi-squared test or Fisher's exact test when appropriate. Continuous data were compared using the t test. Analysis of overall maternal and neonatal outcomes were one-tailed since the initial hypothesis was that there would be no increase in adverse outcomes. Analyses of demographics, visits,	**Admission to hospital for treatment of adverse pregnancy/obstetric outcomes** Postpartum haemorrhage (vaginal delivery)- number (%): Study group: 32 (3.2%) Control group: 33 (3.2%) p=0.47 Postpartum haemorrhage (caesarean delivery)- number (%): Study group: 2 (1.3%) Control group: 3 (2.2%) p=0.77 Preeclampsia (mild)- number (%): Study group: 59 (5.1%) Control group: 66 (5.7%) p=0.74 Preeclampsia (severe)- number (%): Study group: 10 (0.9%) Control group: 9 (0.8%) p=0.74 **Women's experience and satisfaction of antenatal care** Patient satisfaction of quality of prenatal care (as excellent or good, measured on a 4-point scale ranging from excellent to poor)- number (%) Study group: 574 (97.5%) Control group: 587 (97.8%) p=0.67 Number of prenatal visits (just right)- number (%): Study group: 494 (89.2%) Control group: 473 (82.8%)	envelopes containing assignment to either experimental or control group. Neither subjects nor providers were blinded to the study hypothesis and randomisation status). Missing outcome data: High risk. (436 women (16%) lost to follow-up overall. Equal loss in both arms). Measurement of the outcome: High risk. (Outcomes were recorded by staff aware of group allocation and data were extracted from case notes). Selection of the reported result: Some concerns. (Assessment from published study report). Other bias: Low risk. (No other bias suspected). Overall risk: High risk **Other information**

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
			and satisfaction were two-tailed. A p value of <0.05 was considered statistically significant. **Intention-to-treat (ITT) analysis** The experimental and control groups were compared using an ITT analysis. Outcomes of women who were seen more frequently than assigned were analysed according to the initial group assignment.	p=0.002 **Admission to neonatal unit** NICU admission- number: Study group: 42/1175 Control group: 42/1176 **Undiagnosed SGA** Small for gestational age-number (%) Study group: 36 (3.1%) Control group: 28 (2.4%) p=0.16	There were proportionally more nulliparous women in the control group than the study group. Overall, women in the experimental group had 2.7 fewer total visits per pregnancy than those in the control group (p<0.001).
Full citation McDuffie Jr, R. S., Bischoff, K. J., Beck, A., Orleans, M., Does reducing the number of prenatal office visits for low-risk women result in increased use of other medical services?, Obstetrics and Gynecology, 90, 68-70, 1997 **Ref Id** 588344 **Country/ies where the study was carried out**	**Sample size** See McDuffie 1996. **Characteristics** See McDuffie 1996. **Inclusion criteria** See McDuffie 1996. **Exclusion criteria** See McDuffie 1996.	**Interventions** See McDuffie 1996.	**Details** See McDuffie 1996.	**Results** **Admission to hospital for treatment of adverse pregnancy outcomes** Inpatient antepartum admission- number (%): Study group: 54 (4.6%) Control group: 47 (4.0%) p=0.48 Emergency care centre visit-number (%): Study group: 253 (21.7%) Control group: 237 (20.4%) p=0.43	**Limitations** See McDuffie 1996. **Other information** See McDuffie 1996.

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
US **Study type** Randomised controlled trial. **Aim of the study** To determine whether a schedule of fewer prenatal visits than traditional for women with low-risk pregnancies leads to additional medical services outside prescribed prenatal care. **Study dates** See McDuffie 1996. **Source of funding** See McDuffie 1996.					
Full citation Sikorski, J., Wilson, J., Clement, S., Das, S., Smeeton, N., A randomised controlled trial comparing two schedules of antenatal visits: the antenatal	**Sample size** N=2893 (N=2794 analysed) Study group: n=1378 Control group: n=1416 **Characteristics** <u>Gravidity- mean±SD:</u> Study group: 2.3±1.32	**Interventions** Study group: 7 visits for nulliparous women and 6 visits for multiparous women. Control group: 13 visits. The difference between the mean number of visits for the control group vs. the study group was 2.2 (10.8 visits vs. 8.6 visits), p=0.001.	**Details** **Power analysis** The sample size needed to detect a one tailed effect was 2830, at 95% significance level and power of 80%. Assuming a loss rate	**Results** **Severe maternal morbidity up to 42 days post birth** <u>Maternal death- number:</u> Study group: 1/1416 Control group: 0/1378 **Admission to hospital for treatment of adverse**	**Limitations** **Cochrane risk of bias tool V2:** <u>Randomisation process:</u> Low risk. (Random permuted blocks of 8 and 16, stratified by the 6 offices at which

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
care project, BMJ, 312, 546-53, 1996 **Ref Id** 392629 **Country/ies where the study was carried out** UK **Study type** Randomised controlled trial. **Aim of the study** To compare the clinical and psychosocial effectiveness of the traditional British antenatal visit schedule with a reduced schedule of visits for low risk women, together with maternal and professional satisfaction with care. **Study dates** 1993-1994 **Source of funding** Primary Care Development Fund, South Thames	Control group: 2.3±1.40 Parity- mean±SD: Study group: 0.8±1.03 Control group: 0.9±1.06 Age (years)- mean±SD: Study group: 27.96±4.912 Control group: 28.03±5.001 Gestation at booking (weeks)- mean±SD: Study group: 13.04±2.983 Control group: 13.07±3.20 **Inclusion criteria** • Women had a pregnancy of no more than 22 weeks gestation at booking, estimated from the first day of the last normal period; • Pregnancy had reached 24 weeks gestation; • Women were registered as patients of general practitioners agreeing to participate in the project; • Women were booked for delivery at Lewisham, Guy's, or St Thomas's Hospital or at home; • Women had a reasonable understanding of, or literacy in, one of the following: English, Turkish, Vietnamese, Punjabi, Bengali, Cantonese, Spanish, or Portuguese;		of not more than 10%, it was estimated that 3144 women would need to be enrolled into the project. **Statistical analyses** To test the primary hypothesis a one tailed Fisher's exact test was used. Two tailed tests were carried out for all other variables, since the hypotheses to which they relate were not unidirectional. For continuous variables, Student's t test and the Mann-Whitney U test were used. **Intention-to-treat (ITT) analysis** Analysis was by ITT, using SPSS, Confidence Interval Analysis, and Epi Info.	**pregnancy/obstetric outcomes** Antepartum haemorrhage- number (%): Study group: 70/1360 (5.1%) Control group: 74/1391 (5.3%) Primary postpartum haemorrhage- number (%) Study group: 135 (9.9%) Control group: 137 (9.9%) OR (95% CI)- 1.01 (0.79 to 1.62) Preeclampsia- number (%): Study group: 9/1286 (0.7%) Control group: 11/1240 (0.9%) Complications caused by pregnancy related hypertension- treated within 24 hours of admission- number (%): Study group: 20 (29.4%) Control group: 22 (33.3%) OR (95% CI): 0.83 (0.40 to 1.73) Perinatal morbidity (suspicious or abnormal cardiotocogram)- number (%): Study group: 215/1231 (17.5%) Control group: 191/1171 (16.3%) **Women's experience and satisfaction of antenatal care** How good was antenatal care (rated 0-5)- mean±SD: Study group: 3.6±1.02 Control group: 3.8±0.96	the recruiting midwives were based). Deviations from intended interventions (assignment): Some concerns. (Sequentially numbered, non-resealable opaque envelopes containing details of either the traditional or new style visit schedules were used. Blinding was not possible with this type of intervention). Missing outcome data: Low risk. (99 women (3.4%) lost to follow-up. Unclear which arms participants were lost to follow-up). Measurement of the outcome: High risk. (Clinical outcomes were measured by and recorded in maternity notes by staff that were not blind to treatment allocation. There was an attempt to blind research staff collecting data from case notes).

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Regional Health Authority, with additional funding from the Lambeth, Southwark, and Lewisham Health Commission.	• Women of low antenatal risk. **Exclusion criteria** A history of: • Previous fetal loss (18 weeks' gestation or later); • Previous neonatal death; • Three of more consecutive spontaneous abortions; • Cervical suture in a previous pregnancy; • Baby born prematurely at less than 34 weeks' gestation; • Baby weighing less than 2.5kg; • Severe pregnancy related hypertensive disorder with proteinuria in last pregnancy; • Severe non-proteinuric hypertension requiring induction of labour, medication, or epidural for raised blood pressure in last pregnancy; • Previous myomectomy or classical caesarean section; • Essential hypertension, defined as having a diastolic blood pressure >90 mm Hg at booking, or given as part of			p<0.001 Dissatisfied with number of visits (overall)- number (%): Study group: 298 (32.5%) Control group: 155 (16.2%) OR (95% CI): 2.50 (2.00 to 3.11) p<0.05 **Admission to neonatal unit** Admitted to special care unit- number (%): Study group: 47 (3.5%) Control group: 45 (3.2%) OR (95% CI): 1.07 (0.71 to 1.63) **Undiagnosed SGA** Birth weight <3rd centile-number (%): Study group: 94 (6.9%) Control group: 113 (8.1%) OR (95% CI): 0.84 (0.64 to 1.12) Birth weight <10th centile-number (%): Study group: 277 (20.4%) Control group: 302 (21.7%) OR (95% CI): 0.93 (0.77 to 1.12)	Selection of the reported result: Unclear risk. (Assessment from published study report). Other bias: Low risk. (No other bias suspected). Overall risk: Some concerns **Other information** The final sample size was marginally lower than intended, which meant that we were able to test the primary hypothesis with a power of only 79.6% rather than 80%.

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
	medical history by woman in booking interview; • Diabetes mellitus; • Renal disease; • Cardiac disease; • Previous postnatal depression requiring medication (including puerperal psychosis); • Previous cone biopsy; • Rhesus or ABO incompatibility antibodies in a previous pregnancy; • Assisted conception, other than treatment with clomiphene alone. Women currently: • Being treated for tuberculosis; • Taking drugs for a psychiatric disorder; • Aged < 16 or > 40 years of age; • Known substance abuser; • Weighing less than 41 kg (for Asians), 47 kg (Afro-Caribbeans), or 45 kg (any other ethnic group); • Weighing more than 100 kg; • With a multiple pregnancy.				

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Full citation Walker,D.S., Koniak-Griffin,D., Evaluation of a reduced-frequency prenatal visit schedule for low-risk women at a free-standing birthing center, Journal of Nurse-Midwifery, 42, 295-303, 1997 **Ref Id** 175361 **Country/ies where the study was carried out** US **Study type** Prospective randomised controlled trial. **Aim of the study** To evaluate the effectiveness of a reduced frequency prenatal visit schedule by comparing perinatal outcomes, anxiety and maternal satisfaction with prenatal care. **Study dates**	**Sample size** N=122 (N=81 analysed) Study group: n=66 (n=43 analysed) Control group: n=56 (n=38 analysed) **Characteristics** Maternal age (years)- mean±SD (range): Study group: 24.49±5.04 (18.3 to 35.7) Control group: 26.17±5.41 (19.8 to 39.9) Number of weeks pregnant at entry into study- mean±SD (range): Study group: 14.58±5.20 (5 to 25) Control group: 14.29±4.59 (7 to 25) Number of pregnancies, including current pregnancy- mean±SD (range): Study group: 2.12±1.21 (1 to 5) Control group: 2.64±1.31 (1 to 5) **Inclusion criteria** • Low risk pregnancy; • Beginning prenatal care before 26 weeks' gestation; • Older than 18 years of age;	**Interventions** Study group: women were scheduled to attend 8 prenatal visits (an initial visit, and subsequent visits at 15-19 weeks, 24-28 weeks, 32 weeks, 36 weeks, 38 weeks, and weekly until delivery). Control group: women were scheduled to attend 14 prenatal visits (an initial visit, and subsequent visits every 4 weeks until 28 weeks, then every 2 weeks until 36 weeks, and then weekly until delivery). All women followed one visit schedule, regardless of parity.	**Details** **Power analysis** The sample size was selected to provide 80% power to detect a difference of 250g between the mean birth weights of the two groups using a two-tailed T-test. **Statistical analyses** Pearson's correlations were conducted, where appropriate, to describe the relationships between the variables. All tests were two-tailed with an alpha level of 0.05. **Intention-to-treat (ITT) analysis** Not mentioned.	**Results** **Admission to hospital for treatment of adverse pregnancy/obstetric outcomes** Maternal complications- Preterm labour (number): Study group: 1 Control group: 3 Maternal complications- Intrauterine growth restriction (number): Study group: 0 Control group: 1 Maternal complications- Anemia (number): Study group: 1 Control group: 1 Maternal complications- Recurrent urinary tract infection (number): Study group: 1 Control group: 1 Maternal complications- Pregnancy induced hypertension (number): Study group: 2 Control group: 1 Maternal complications- Fetal malposition (number): Study group: 2 Control group: 1 **Women's experience and satisfaction of antenatal care** Satisfaction with prenatal care provider (Patient Satisfaction with Prenatal Care instrument)- F score:	**Limitations** **Cochrane risk of bias tool V2:** Randomisation process: Low risk. (Computerised software used to randomise participants according to demographic data and personal characteristics). Deviations from intended interventions (assignment): High risk. (Blinding of participants and personnel was not possible for this intervention). Missing outcome data: High risk. (37 women (30%) lost to follow-up overall. Equal loss from both arms). Measurement of the outcome: High risk. (Outcomes were measured and recorded by staff aware of group allocation). Selection of the reported result: Some concerns. (Assessment from

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
1993 to 1994. **Source of funding** Not mentioned.	• Ability to speak or read Spanish or English. **Exclusion criteria** Not mentioned.			Study group vs. Control group: F= 5.74, p=0.02 *calculated SMD (SE): -0.53 (0.23) 95% CI (-0.98 to 0.23) **Admission to neonatal unit** Days in the neonatal intensive care unit- 1 day (mean±SD): Study group: 1±2.3 Control group: 1±2.6 Days in the neonatal intensive care unit- 5 days (mean±SD): Study group: 0 Control group: 2±4.7 Days in the neonatal intensive care unit- 9 days (mean±SD): Study group: 0 Control group: 1±2.3 Number of neonates admitted to NICU- number: Study group: 4/43 Control group: 1/38 **Undiagnosed small for gestational age** Study group: 0/43 Control group: 1/38	published study report). Other bias: Low risk. (No other bias suspected). Overall risk: High risk **Other information** Overall, women in the experimental group attended 3.2 visits fewer than those in the traditional group (P = 0.0001).

RR: risk ratio; SD: standard deviation.

Appendix E – Forest plots

Forest plots for review question: Is a reduced number of antenatal appointments as effective as standard care?

This section includes forest plots only for outcomes that are meta-analysed. Outcomes from single studies are not presented here, but the quality assessment for these outcomes is provided in the GRADE profiles in appendix F.

Figure 2: Severe maternal morbidity up to 42 days post-birth

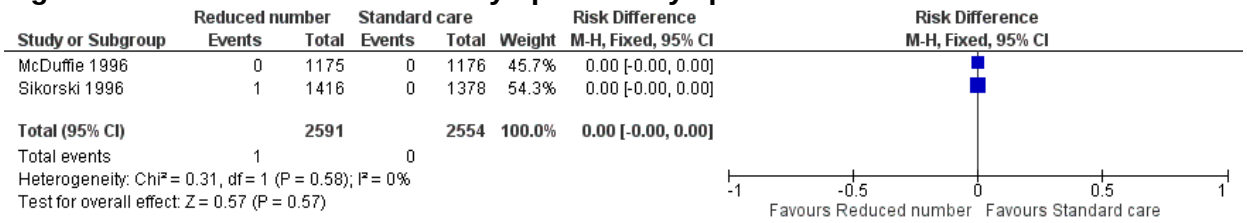


Figure 3: Any fetal death (after 24+0 weeks)

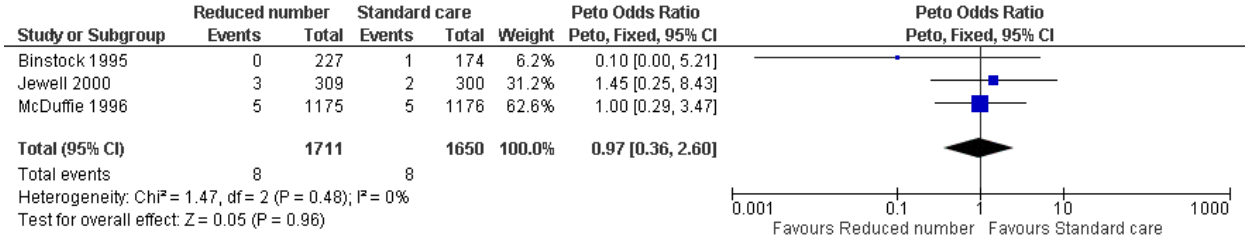


Figure 4: Admission to hospital for treatment of adverse pregnancy outcomes- Antenatal problems

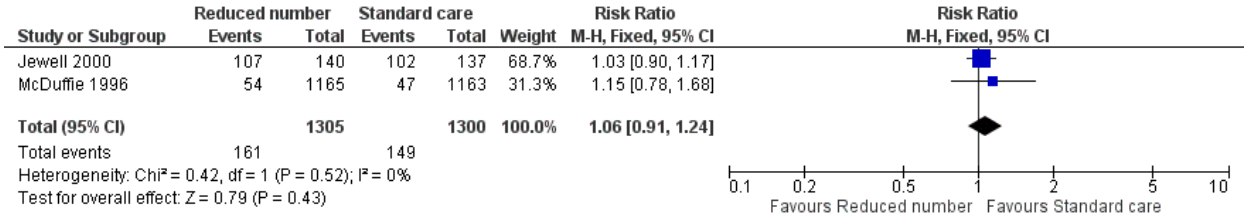


Figure 5: Admission to hospital for treatment of adverse pregnancy outcomes- Antepartum and postpartum haemorrhage

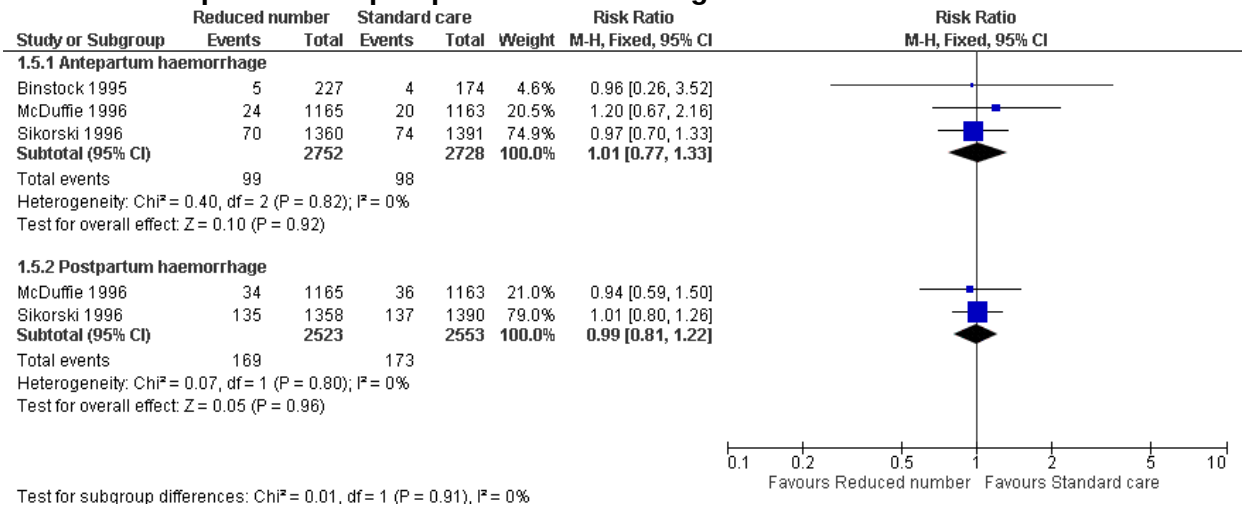


Figure 6: Admission to hospital for treatment of adverse pregnancy outcomes- Hypertension

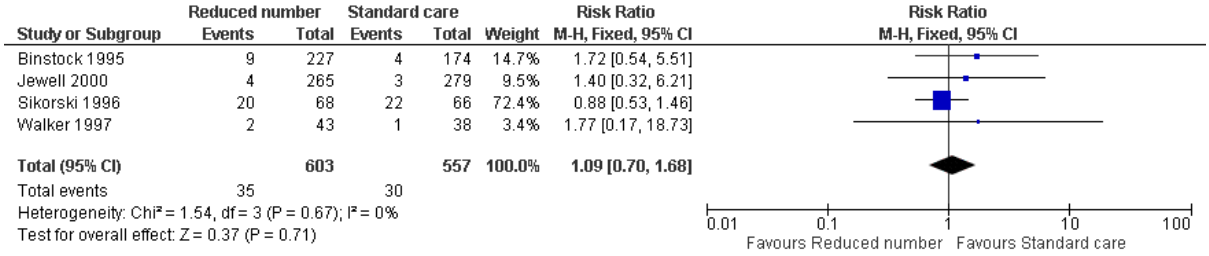


Figure 7: Admission to hospital for treatment of adverse pregnancy outcomes- Preeclampsia

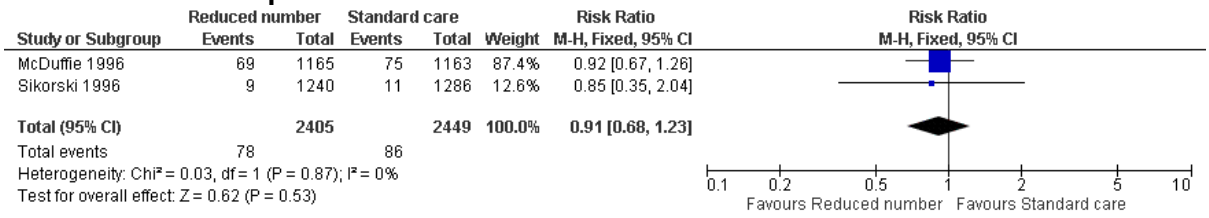


Figure 8: Admission to hospital for treatment of adverse pregnancy outcomes- Urinary tract infections

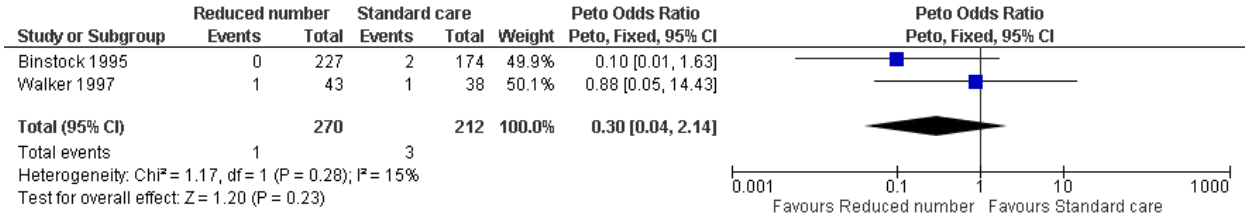


Figure 9: Women's experience and satisfaction of antenatal care- Satisfaction with number of visits ('slightly too many' or 'too many')

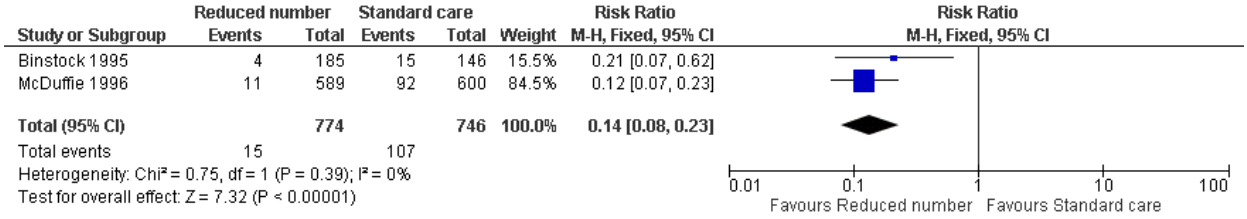


Figure 10: Women's experience and satisfaction of antenatal care- Satisfaction with number of visits ('not quite enough' or 'too few')

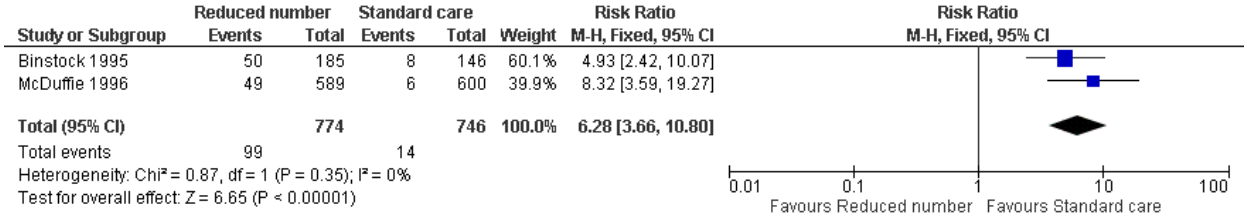


Figure 11: Women's experience and satisfaction of antenatal care- Satisfaction with number of visits ('slightly too many', 'too many', or 'just right')

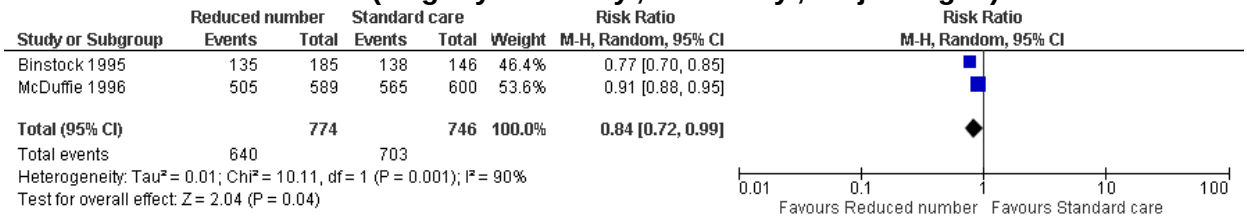


Figure 12: Admission to neonatal unit- Number of neonates

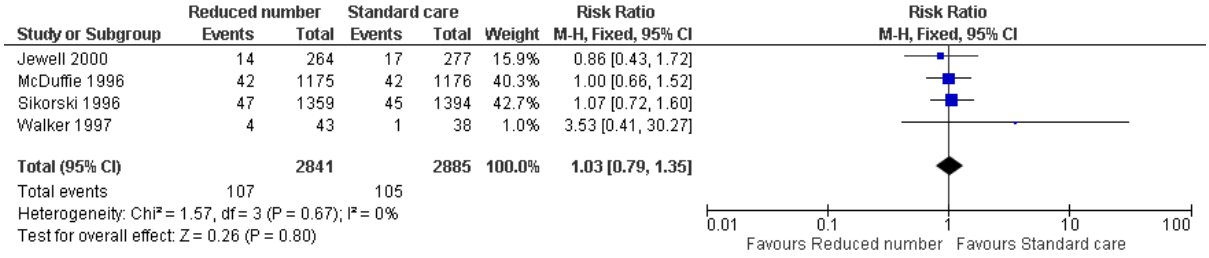
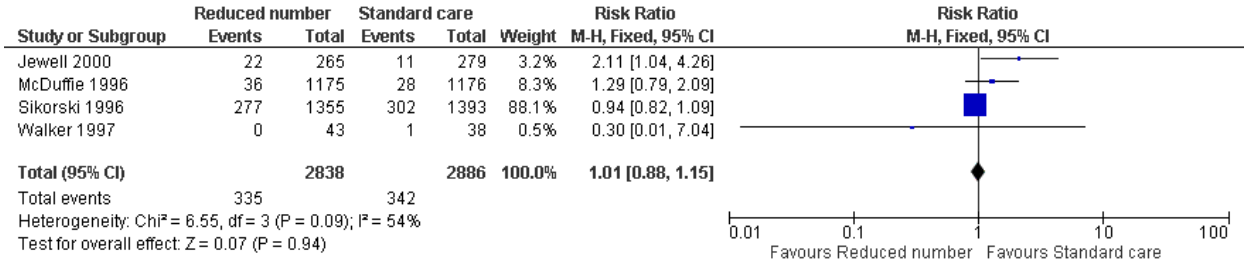


Figure 13: Undiagnosed small for gestational age



Appendix F – GRADE tables

GRADE tables for review question: Is a reduced number of antenatal appointments as effective as standard care?

Table 5: Clinical evidence profile for is a reduced number of antenatal appointments as effective as standard care?

Quality assessment							No of patients		Effect		Quality	Importance
No of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Reduced number	Standard care	Relative (95% CI)	Absolute		
Severe maternal morbidity up to 42 days postbirth												
2‡	randomised trials	serious[1]	no serious inconsistency	no serious indirectness	very serious[2]	none	1/2591 (0.04%)	0/2554 (0%)	RD 0.00 (-0.00 to 0.00)	0 fewer per 1000 (from 0 to 0)	⊕OOO VERY LOW	CRITICAL
Any fetal death (after 24+0 weeks)												
3‡	randomised trials	very serious[3]	no serious inconsistency	no serious indirectness	very serious[2]	none	8/1711 (0.47%)	8/1650 (0.48%)	Peto OR 0.97 (0.36 to 2.6)	0 fewer per 1000 (from 3 fewer to 8 more)	⊕OOO VERY LOW	CRITICAL
Admission to hospital for treatment of adverse pregnancy outcomes- Anaemia												
1 (Walker 1997)	randomised trials	very serious[4]	no serious inconsistency	serious[5]	very serious[2]	none	1/43 (2.3%)	1/38 (2.6%)	RR 0.88 (0.06 to 13.65)	3 fewer per 1000 (from 25 fewer to 333 more)	⊕OOO VERY LOW	IMPORTANT
Admission to hospital for treatment of adverse pregnancy outcomes- Antenatal problems												
2‡	randomised trials	serious[1]	no serious inconsistency	serious[5]	no serious imprecision	none	161/1305 (12.3%)	149/1300 (11.5%)	RR 1.06 (0.91 to 1.24)	7 more per 1000 (from 10 fewer to 28 more)	⊕⊕OO LOW	IMPORTANT
Admission to hospital for treatment of adverse pregnancy outcomes- Fetal malposition												
1 (Walker 1997)	randomised trials	very serious[4]	no serious inconsistency	serious[5]	very serious[2]	none	2/43 (4.7%)	1/38 (2.6%)	RR 1.77 (0.17 to 18.73)	20 more per 1000 (from 22 fewer to 467 more)	⊕OOO VERY LOW	IMPORTANT

Quality assessment							No of patients		Effect		Quality	Importance
No of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Reduced number	Standard care	Relative (95% CI)	Absolute		
Admission to hospital for treatment of adverse pregnancy outcomes- Haemorrhage - Antepartum haemorrhage												
3‡	randomised trials	very serious[6]	no serious inconsistency	no serious indirectness	very serious[2]	none	99/2752 (3.6%)	98/2728 (3.6%)	RR 1.01 (0.77 to 1.33)	0 more per 1000 (from 8 fewer to 12 more)	⊕OOO VERY LOW	IMPORTANT
Admission to hospital for treatment of adverse pregnancy outcomes- Haemorrhage - Postpartum haemorrhage												
2‡	randomised trials	serious[7]	no serious inconsistency	no serious indirectness	no serious imprecision	none	169/2523 (6.7%)	173/2553 (6.8%)	RR 0.99 (0.81 to 1.22)	1 fewer per 1000 (from 13 fewer to 15 more)	⊕⊕⊕O MODERATE	IMPORTANT
Admission to hospital for treatment of adverse pregnancy outcomes- Hypertension												
4‡	randomised trials	very serious[8]	no serious inconsistency	no serious indirectness	very serious[2]	none	35/603 (5.8%)	30/557 (5.4%)	RR 1.09 (0.7 to 1.68)	5 more per 1000 (from 16 fewer to 37 more)	⊕OOO VERY LOW	IMPORTANT
Admission to hospital for treatment of adverse pregnancy outcomes- Intrauterine growth restriction												
1 (Walker 1997)	randomised trials	very serious[4]	no serious inconsistency	serious[5]	very serious[2]	none	0/43 (0%)	1/38 (2.6%)	Peto OR 0.12 (0 to 6.02)	23 fewer per 1000 (from 26 fewer to 132 more)	⊕OOO VERY LOW	IMPORTANT
Admission to hospital for treatment of adverse pregnancy outcomes- Preeclampsia												
2‡	randomised trials	serious[7]	no serious inconsistency	no serious indirectness	serious[9]	none	78/2405 (3.2%)	86/2449 (3.5%)	RR 0.91 (0.68 to 1.23)	3 fewer per 1000 (from 11 fewer to 8 more)	⊕⊕OO LOW	CRITICAL
Admission to hospital for treatment of adverse pregnancy outcomes- Suspicious/abnormal cardiotocogram												
1 (Sikorski 1986)	randomised trials	serious[10]	no serious inconsistency	serious[5]	serious[9]	none	215/1231 (17.5%)	191/1171 (16.3%)	RR 1.07 (0.9 to 1.28)	11 more per 1000 (from 16 fewer to 46 more)	⊕OOO VERY LOW	IMPORTANT
Admission to hospital for treatment of adverse pregnancy outcomes- Urinary tract infections												

Quality assessment							No of patients		Effect		Quality	Importance
No of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Reduced number	Standard care	Relative (95% CI)	Absolute		
2‡	randomised trials	very serious[11]	no serious inconsistency	serious[5]	very serious[2]	none	1/270 (0.37%)	3/212 (1.4%)	Peto OR 0.30 (0.04 to 2.14)	10 fewer per 1000 (from 14 fewer to 16 more)	⊕OOO VERY LOW	IMPORTANT
Women's experience and satisfaction of antenatal care - Satisfaction with appointment arrangements (follow-up 1 to 6 weeks; measured with: Six point scale; range of scores: 1-6; Better indicated by higher values)												
1 (Binstock 1995)	randomised trials	very serious[12]	no serious inconsistency	no serious indirectness	serious[13]	none	185	146	-	MD 0.5 higher (0.25 to 0.75 higher)	⊕OOO VERY LOW	IMPORTANT
Women's experience and satisfaction of antenatal care - Satisfaction with medical care (follow-up 1-6 weeks; measured with: Six point scale; range of scores: 1-6; Better indicated by higher values)												
1 (Binstock 1995)	randomised trials	very serious[12]	no serious inconsistency	no serious indirectness	very serious[14]	none	185	146	-	MD 0.1 higher (0.64 lower to 0.84 higher)	⊕OOO VERY LOW	IMPORTANT
Women's experience and satisfaction of antenatal care - Satisfaction with pregnancy education (follow-up 1-6 weeks; measured with: Six point scale ; range of scores: 1-6; Better indicated by higher values)												
1 (Binstock 1995)	randomised trials	very serious[12]	no serious inconsistency	no serious indirectness	no serious imprecision	none	185	146	-	MD 0.3 higher (0.07 to 0.53 higher)	⊕⊕OO LOW	IMPORTANT
Women's experience and satisfaction of antenatal care - Overall satisfaction (follow-up 6 weeks; measured with: Six point scale ; range of scores: 0-5; Better indicated by higher values)												
1 (Sikorski 1996)	randomised trials	serious[10]	serious[15]	no serious indirectness	no serious imprecision	none	910	957	-	MD 0.2 lower (0.29 to 0.11 lower)	⊕⊕OO LOW	IMPORTANT
Women's experience and satisfaction of antenatal care- Satisfaction with care (measured with: 0-100 scale; range of scores: 0-100; Better indicated by higher values)												
1 (Butler 2019)	randomised trials	serious[16]	serious[15]	no serious indirectness	no serious imprecision	none	134	133	-	MD 15.01 higher (13.38 to 16.64 higher)	⊕⊕OO LOW	IMPORTANT
Women's experience and satisfaction of antenatal care- Dissatisfaction with number of visits (follow-up 6 weeks)												

Quality assessment							No of patients		Effect		Quality	Importance
No of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Reduced number	Standard care	Relative (95% CI)	Absolute		
1 (Sikorski 1996)	randomised trials	serious[10]	no serious inconsistency	no serious indirectness	no serious imprecision	none	298/916 (32.5%)	155/957 (16.2%)	RR 2.01 (1.69 to 2.38)	164 more per 1000 (from 112 more to 224 more)	⊕⊕⊕O MODERATE	IMPORTANT
Women's experience and satisfaction of antenatal care- Satisfaction with number of visits - 'Slightly too many' or 'Too many' (follow-up 1-6 weeks; assessed with: Patient report on scale)												
2‡	randomised trials	serious[17]	no serious inconsistency	no serious indirectness	no serious imprecision	none	15/774 (1.9%)	107/746 (14.3%)	RR 0.14 (0.08 to 0.23)	123 fewer per 1000 (from 110 fewer to 132 fewer)	⊕⊕⊕O MODERATE	IMPORTANT
Women's experience and satisfaction of antenatal care- Satisfaction with number of visits - 'Not quite enough' or 'Too few' (follow-up 1-6 weeks; assessed with: Patient report on scale)												
2‡	randomised trials	serious[17]	no serious inconsistency	no serious indirectness	no serious imprecision	none	99/774 (12.8%)	14/746 (1.9%)	RR 6.28 (3.66 to 10.80)	99 more per 1000 (from 50 more to 184 more)	⊕⊕⊕O MODERATE	IMPORTANT
Women's experience and satisfaction of antenatal care- Satisfaction with number of visits - Slightly too many, too many or just right (follow-up 1-6 weeks; assessed with: Patient report on scale)												
2‡	randomised trials	serious[17]	serious[18]	no serious indirectness	serious[9]	none	640/774 (82.7%)	703/746 (94.2%)	RR 0.84 (0.72 to 0.99)	151 fewer per 1000 (from 9 fewer to 264 fewer)	⊕OOO VERY LOW	IMPORTANT
Women's experience and satisfaction of antenatal care- Satisfaction of quality of care (follow-up 6 weeks; assessed with: Four point scale)												
1 (McDuffie 1996)	randomised trials	very serious[19]	no serious inconsistency	no serious indirectness	no serious imprecision	none	574/589 (97.5%)	587/600 (97.8%)	RR 1 (0.98 to 1.01)	0 fewer per 1000 (from 20 fewer to 10 more)	⊕⊕OO LOW	IMPORTANT
Women's experience and satisfaction of antenatal care- Satisfaction of care provision - Care provided by midwives (follow-up 10 weeks; assessed with: Postal questionnaire)												
1 (Jewell 2000)	randomised trials	serious[10]	no serious inconsistency	no serious indirectness	serious[9]	none	135/224 (60.3%)	174/242 (71.9%)	RR 0.84 (0.73 to 0.96)	115 fewer per 1000 (from 29 fewer to 194 fewer)	⊕⊕OO LOW	IMPORTANT
Women's experience and satisfaction of antenatal care- Satisfaction of care provision - Care provided by family doctors (follow-up 10 weeks; assessed with: Postal questionnaire)												

Quality assessment							No of patients		Effect		Quality	Importance
No of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Reduced number	Standard care	Relative (95% CI)	Absolute		
1 (Jewell 2000)	randomised trials	serious[10]	no serious inconsistency	no serious indirectness	serious[9]	none	90/196 (45.9%)	109/213 (51.2%)	RR 0.9 (0.73 to 1.1)	51 fewer per 1000 (from 138 fewer to 51 more)	⊕⊕OO LOW	IMPORTANT
Women's experience and satisfaction of antenatal care- Satisfaction of care provision (follow-up 6 weeks; measured with: Patient Satisfaction and Prenatal Care scale ; range of scores: 1-6; Better indicated by lower values)												
1[20] (Walker 1997)	randomised trials	serious[4]	no serious inconsistency	no serious indirectness	serious[21]	none	43	38	-	SMD 0.53 lower (0.98 to 0.09 lower)	⊕⊕OO LOW	IMPORTANT
Admission to neonatal unit- Length of stay (days) - 1 day (Better indicated by lower values)												
1 (Walker 1997)	randomised trials	serious[4]	no serious inconsistency	no serious indirectness	no serious imprecision	none	43	38	-	MD 0 higher (1.08 lower to 1.08 higher)	⊕⊕⊕O MODERATE	IMPORTANT
Admission to neonatal unit- Length of stay (days) - 5 days (Better indicated by lower values)												
1 (Walker 1997)	randomised trials	serious[4]	no serious inconsistency	no serious indirectness	no serious imprecision	none	43	38	-	MD 0 higher (0 to 0 higher)	⊕⊕⊕O MODERATE	IMPORTANT
Admission to neonatal unit- Length of stay (days) - 9 days (Better indicated by lower values)												
1 (Walker 1997)	randomised trials	serious[4]	no serious inconsistency	no serious indirectness	no serious imprecision	none	43	38	-	MD 0 higher (0 to 0 higher)	⊕⊕⊕O MODERATE	IMPORTANT
Admission to neonatal unit- Length of stay (hours) (Better indicated by lower values)												
1 (Binstock 1995)	randomised trials	very serious[12]	no serious inconsistency	no serious indirectness	no serious imprecision	none	227	174	-	MD 2 higher (25.43 lower to 29.43 higher)	⊕⊕OO LOW	IMPORTANT
Admission to neonatal unit- Number of neonates												
4‡	randomised trials	serious[22]	no serious inconsistency	no serious indirectness	very serious[2]	none	107/2841 (3.8%)	105/2885 (3.6%)	RR 1.03 (0.79 to 1.35)	1 more per 1000 (from 8 fewer to 13 more)	⊕OOO VERY LOW	IMPORTANT

Quality assessment							No of patients		Effect		Quality	Importance
No of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Reduced number	Standard care	Relative (95% CI)	Absolute		
Undiagnosed small for gestational age												
4‡	randomised trials	serious[22]	serious[23]	serious[24]	serious[9]	none	335/2838 (11.8%)	342/2886 (11.9%)	RR 1.01 (0.88 to 1.15)	1 more per 1000 (from 14 fewer to 18 more)	⊕OOO VERY LOW	IMPORTANT

CI: confidence interval; MD: mean difference; OR: odds ratio; RR: risk ratio

[1] Downgraded by 1 level due to high risk of performance and detection bias and unclear risk of reporting bias in both studies. High risk of attrition bias in one study.

[2] Evidence downgraded by 2 levels because 95% CI crosses 2 default MIDs for dichotomous outcomes (0.8 and 1.25).

[3] Downgraded by 2 levels due to high risk of performance and detection bias, and unclear risk of reporting bias in all three studies. High risk of attrition bias in two studies. High risk of selection and other biases in one study. Unclear risk of selection bias in one study.

[4] Downgraded by 2 levels due to high risk of performance, detection, and attrition bias. Unclear risk of selection and reporting bias.

[5] Downgraded by 1 level because it is unclear whether women were hospitalised for this outcome.

[6] Downgraded by 2 levels due to high risk of performance and detection bias, and unclear risk of reporting bias in all three studies. High risk of attrition bias in two studies. High risk of selection bias in one study.

[7] Downgraded by 1 level due to high risk of performance and detection bias, and unclear risk of reporting bias in both studies. High risk of attrition bias in one study.

[8] Downgraded by 2 levels due to high risk of performance and detection bias and unclear risk of reporting bias in all four studies. High risk of attrition bias in two studies. High risk of selection and other biases in one study. Unclear risk of selection bias in one study.

[9] Evidence downgraded by 1 level because 95% CI crosses 1 default MID for dichotomous outcomes (0.8 or 1.25).

[10] Downgraded by 1 level due to high risk of performance and detection bias and unclear risk of reporting bias.

[11] Downgraded by 2 levels due to high risk of performance, detection, and attrition bias, and unclear risk of reporting bias. High risk of selection bias and other biases in one study and unclear risk of selection bias in one study.

[12] Downgraded by 2 levels due to high risk of selection, performance, detection, attrition, and other biases. Unclear risk of reporting bias.

[13] MID for this outcome, calculated as 0.5 times the mean SD of the control arm, is +/- 0.60. Evidence downgraded by 1 because 95% CI crosses 1 MID (0.60).

[14] MID for this outcome, calculated as 0.5 times the mean SD of the control arm, is +/- 0.5. Evidence downgraded by 2 because 95% CI crosses 2 MIDs (-0.5 and 0.5).

[15] Heterogeneity too high (I2 100%) to allow for meta-analysis via SMD.

[16] Downgraded by 1 level due to high risk of attrition bias, and unclear risk of detection and reporting bias.

[17] Downgraded by 1 level due to high risk of attrition, performance and detection bias and unclear risk of reporting bias in both studies. High risk of selection bias and other biases in one study.

[18] Evidence downgraded 1 level because although there is very serious heterogeneity (i2=90%), studies contributing to outcome conclude the same result.

[19] Downgraded by 2 levels due to high risk of attrition, performance and detection bias, and unclear risk of reporting bias.

[20] Outcome analysed as SMD since paper reported F value.

[21] Evidence downgraded by 1 level because 95% CI crosses 1 default MID for SMD (+/-0.5).

[22] Downgraded by 1 level due high risk of performance and detection bias, and unclear risk of reporting bias in all four studies. High risk of attrition bias in two studies and unclear risk of bias in one study.

[23] Evidence downgraded 1 level due to serious heterogeneity (i2=54%).

[24] Downgraded by 1 level because it is unclear whether SGA was undiagnosed.

‡ *For references see corresponding Forest Plot*

Appendix G – Economic evidence study selection

Economic evidence study selection for review question: Is a reduced number of antenatal appointments as effective as standard care?

A single economic search was undertaken for all topics included in the scope of this guideline. No economic studies were identified which were applicable to this review question. See supplementary material 2 for details.

Appendix H – Economic evidence tables

Economic evidence tables for review question: Is a reduced number of antenatal appointments as effective as standard care?

No economic evidence was identified which was applicable to this review question.

Appendix I – Economic evidence profiles

Economic evidence profiles for review question: Is a reduced number of antenatal appointments as effective as standard care?

No economic evidence was identified which was applicable to this review question.

Appendix J – Economic analysis

Economic evidence analysis for review question: Is a reduced number of antenatal appointments as effective as standard care?

No economic analysis was conducted for this review question.

Appendix K – Excluded studies

Excluded clinical and economic studies for review question: Is a reduced number of antenatal appointments as effective as standard care?

Clinical studies

Table 6: Excluded studies and reasons for their exclusion

Study	Reason for exclusion
Abyad, A., Routine prenatal screening revisited, Health Care for Women International, 20, 137-45, 1999	Does not compare different numbers of antenatal appointments
Allen,J., Gamble,J., Stapleton,H., Kildea,S., Does the way maternity care is provided affect maternal and neonatal outcomes for young women? A review of the research literature, Women and Birth, 25, 54-63, 2012	Does not compare different numbers of antenatal appointments
Alwan, N. A., Roderick, P. J., MacKlon, N. S., Is timing of the first antenatal visit associated with adverse birth outcomes? Analysis from a population-based birth cohort, The Lancet, 388 (SPEC.ISS 1), 18, 2016	Conference abstract.
Barr,W.B., Aslam,S., Levin,M., Evaluation of a group prenatal care-based curriculum in a family medicine residency, Family Medicine, 43, 712-717, 2011	Does not compare different numbers of antenatal appointments
Beeckman, K., Louckx, F., Downe, S., Putman, K., The relationship between antenatal care and preterm birth: the importance of content of care, European Journal of Public Health, 23, 366-71, 2013	Does not compare different numbers of antenatal appointments
Berglund,A.C., Lindmark,G.C., Health services effects of a reduced routine programme for antenatal care. An area-based study, European Journal of Obstetrics, Gynecology, and Reproductive Biology, 77, 193-199, 1998	Study design is specified as exclusion criteria in protocol.
Blondel, B., Bréart, G., Llado, J., Chartier, M., Evaluation of the home-visiting system for women with threatened preterm labor: results of a randomized controlled trial, European journal of obstetrics, gynecology, and reproductive biology, 34, 47-58, 1990	Does not compare different numbers of antenatal appointments
Breastfeeding Discussions Inadequate at First Prenatal Visit, Inside Childbirth Education, 14-14, 2013	Article unavailable.
Bush, J., Barlow, D. E., Echols, J., Wilkerson, J., Bellevin, K., Impact of a Mobile Health Application on User Engagement and Pregnancy Outcomes Among Wyoming Medicaid Members, Telemedicine journal and e-health : the official journal of the American Telemedicine Association, 23, 891-898, 2017	Does not compare different numbers of antenatal appointments
Butler, M. M., Sheehy, L., Kington, M. M., Walsh, M. C., Brosnan, M. C., Murphy, M.,	Does not compare different numbers of antenatal appointments

Study	Reason for exclusion
Naughton, C., Drennan, J., Barry, T., Evaluating midwife-led antenatal care: choice, experience, effectiveness, and preparation for pregnancy, Midwifery, 31, 418-425, 2015	
Candy, B., Clement, S., Sikorski, J., Wilson, J., Antenatal visits, Practising Midwife, 3, 21-4, 2000	Does not compare different numbers of antenatal appointments
Carroli, G., Villar, J., Piaggio, G., Khan-Neelofur, D., Gulmezoglu, M., Mugford, M., Lumbiganon, P., Farnot, U., Bersgjo, P., WHO systematic review of randomised controlled trials of routine antenatal care, Lancet, 357, 1565-1570, 2001	Systematic review of RCTs. All relevant RCTs extracted and included.
Chinouya, Martha J., Madziva, Cathrine, Late booking amongst African women in a London borough, England: implications for health promotion, Health Promotion International, 34, 123-132, 2019	Study design is specified as exclusion criteria in protocol.
Clement, S., Candy, B., Sikorski, J., Wilson, J., Smeeton, N., Does reducing the frequency of routine antenatal visits have long term effects? Follow up of participants in a randomised controlled trial, British journal of obstetrics and gynaecology, 106, 367-370, 1999	This reports results of a regression model (which attempts to predict satisfaction with different schedules using various patient characteristics), rather than satisfaction with the interventions.
Clement, S., Sikorski, J., Wilson, J., Das, S., Smeeton, N., Women's satisfaction with traditional and reduced antenatal visit schedules, Midwifery, 12, 120-128, 1996	This reports results of a regression model (which attempts to predict satisfaction with different schedules using various patient characteristics), rather than satisfaction with the interventions.
Crafter, H., Frequency of antenatal appointments, RCM Midwives Journal, 1, 232-232, 1998	Study design is specified as exclusion criteria in protocol.
Cresswell, J. A., Yu, G., Hatherall, B., Morris, J., Jamal, F., Harden, A., Renton, A., Predictors of the timing of initiation of antenatal care in an ethnically diverse urban cohort in the UK, BMC Pregnancy and Childbirth, 13 (no pagination), 2013	Study design is specified as exclusion criteria in protocol.
Culliney, K. A. T., Parry, G. K., Brown, J., Crowther, C. A., Regimens of fetal surveillance of suspected large for gestational ge fetuses for improving health outcomes, Cochrane Database of Systematic Reviews, 2016	Does not compare different numbers of antenatal appointments
Damiano, E., Theiler, R., Improved Value of Individual Prenatal Care for the Interdisciplinary Team, Journal of Pregnancy, 2018, 3515302, 2018	Study design is specified as exclusion criteria in protocol.
Dansereau, E., McNellan, C. R., Gagnier, M. C., Desai, S. S., Haakenstad, A., Johanns, C. K., Palmisano, E. B., Rios-Zertuche, D., Schaefer, A., Zuniga-Brenes, P., Hernandez, B., Iriarte, E., Mokdad, A. H., Coverage and timing of antenatal care among poor women in 6 Mesoamerican countries, BMC Pregnancy and Childbirth, 16 (1) (no pagination), 2016	Study design is specified as exclusion criteria in protocol.
Dawson,A., Cohen,D., Candelier,C., Jones,G., Sanders,J., Thompson,A., Arnall,C., Coles,E.,	HTA assessing the use of a new application of technology.

Study	Reason for exclusion
Domiciliary midwifery support in high-risk pregnancy incorporating telephonic fetal heart rate monitoring: a health technology randomized assessment, Journal of Telemedicine and Telecare, 5, 220-230, 1999	
Debiec, K. E., Paul, K. J., Mitchell, C. M., Hitti, J. E., Inadequate prenatal care and risk of preterm delivery among adolescents: A retrospective study over 10 years, American journal of obstetrics and gynecology, 203, 122.e1-122.e6, 2010	Does not compare different numbers of antenatal appointments
Deverill,M., Lancsar,E., Snaith,V.B., Robson,S.C., Antenatal care for first time mothers: a discrete choice experiment of women's views on alternative packages of care, European Journal of Obstetrics, Gynecology, and Reproductive Biology, 151, 33-37, 2010	Does not compare different numbers of antenatal appointments
Dodd, J. M., Dowswell, T., Crowther, C. A., Specialised antenatal clinics for women with a multiple pregnancy for improving maternal and infant outcomes, The Cochrane Database of Systematic Reviews, 11, CD005300, 2015	Multiple pregnancies excluded in review protocol.
Dowswell, T., Carroli, G., Duley, L., Gates, S., Gülmezoglu, A. M., Khan Neelofur, D., Piaggio, G., Alternative versus standard packages of antenatal care for low risk pregnancy, Cochrane Database of Systematic Reviews, 2015	Cochrane review of RCTs. Relevant RCTs extracted.
Dyson,D.C., Danbe,K.H., Bamber,J.A., Crites,Y.M., Field,D.R., Maier,J.A., Newman,L.A., Ray,D.A., Walton,D.L., Armstrong,M.A., Monitoring women at risk for preterm labor, New England Journal of Medicine, 338, 15-19, 1998	Does not compare different numbers of antenatal appointments
Haddrill, R., Jones, G. L., Mitchell, C. A., Anumba, D. O. C., Understanding delayed access to antenatal care: A qualitative interview study, BMC Pregnancy and Childbirth, 14 (1) (no pagination), 2014	Study design is specified as exclusion criteria in protocol.
Heetkamp, K. M., Bakker, R., Torij, H. W., Steegers, E. A. P., Bonsel, G. J., Denktas, S., Characteristics of women with late antenatal booking in The Netherlands, Reproductive Sciences, 1), 209A, 2012	Abstract only. No full paper available.
Henderson, J., Roberts, T., Sikorski, J., Wilson, J., Clement, S., An economic evaluation comparing two schedules of antenatal visits, Journal of Health Services Research and Policy, 5, 69-75, 2000	Health economic evaluation.
Hijazi, A., Althubaiti, A., Al-Kadri, H. M., Effect of antenatal care on fetal, neonatal and maternal outcomes: A retrospective cohort study, Internet Journal of Gynecology and Obstetrics, 23, 2018	Does not compare different numbers of antenatal appointments
Hofmeyr, G. J., Hodnett, E. D., Antenatal care packages with reduced visits and perinatal mortality: A secondary analysis of the WHO	Does not compare different numbers of antenatal appointments

Study	Reason for exclusion
antenatal care trial - Comentary: Routine antenatal visits for healthy pregnant women do make a difference, Reproductive health, 10 (1) (no pagination), 2013	
Homer, C. S. E., Davis, G. K., Brodie, P. M., What do women feel about community-based antenatal care?, Australian and new zealand journal of public health, 24, 590-595, 2000	Does not compare different numbers of antenatal appointments
Homer,C.S.E., Davis,G.K., Brodie,P.M., Sheehan,A., Barclay,L.M., Wills,J., Chapman,M.G., Collaboration in maternity care: A randomised controlled trial comparing community-based continuity of care with standard hospital care, British Journal of Obstetrics and Gynaecology, 108, 16-22, 2001	Does not compare different numbers of antenatal appointments
Khan-Neelofur,D., Gulmezoglu,M., Villar,J., Who should provide routine antenatal care for low-risk women, and how often? A systematic review of randomised controlled trials, Paediatric and Perinatal Epidemiology, 12, 7-26, 1998	Systematic review. All relevant articles included in review.
Lauderdale, D. S., Vanderweele, T. J., Siddique, J., Lantos, J. D., Prenatal care utilization in excess of recommended levels: trends from 1985 to 2004, Medical Care Research & Review, 67, 609-22, 2010	Study design is specified as exclusion criteria in protocol.
Lennon, S., Londono, Y., Heaman, M., Kingston, D., Bayrampour, H., The effectiveness of interventions to improve access to and utilization of prenatal care: a systematic review protocol, JBI Database Of Systematic Reviews And Implementation Reports, 13, 10-23, 2015	Does not compare different numbers of antenatal appointments
Loughnan, B. A., Robinson, P. N., Ethnicity and late booking in an urban obstetric population, Public Health, 123, 723-4, 2009	Does not compare different numbers of antenatal appointments
Magriples,U., Kershaw,T.S., Rising,S.S., Massey,Z., Ickovics,J.R., Prenatal health care beyond the obstetrics service: utilization and predictors of unscheduled care, American Journal of Obstetrics and Gynecology, 198, 75-77, 2008	Does not compare different numbers of antenatal appointments
Mbuagbaw, L., Medley, N., Darzi, A. J., Richardson, M., Habiba Garga, K., Ongoloâ€• Zogo, P., Health system and community level interventions for improving antenatal care coverage and health outcomes, Cochrane Database of Systematic Reviews, 2015	Does not compare different numbers of antenatal appointments
McLaughlin,, F, Joseph, And, Others, Effect of Comprehensive Prenatal Care and Psychosocial Support on Birthweights of Infants of Low-Income Women, 17, 1989	Does not compare different numbers of antenatal appointments
Mengistu, T. A., Tafere, T. E., Effect of antenatal care on institutional delivery in developing countries: a systematic review, JBI Library of Systematic Reviewis, 9, 1447-1470, 2011	Article unavailable.

Study	Reason for exclusion
Moller, A. B., Petzold, M., Chou, D., Say, L., Early antenatal care visit: a systematic analysis of regional and global levels and trends of coverage from 1990 to 2013, The Lancet Global Health, 5, e977-e983, 2017	Study could be relevant but does not help to answer the research question.
Mukhopadhyay, S., Wendel, J., Are prenatal care resources distributed efficiently across high-risk and low-risk mothers?, International Journal of Health Care Finance & Economics, 8, 163-79, 2008	Does not compare different numbers of antenatal appointments
Nettleman,M.D., Brewer,J., Stafford,M., Scheduling the first prenatal visit: Office-based delays, American Journal of Obstetrics and Gynecology, #203, -207e3, 2010	Study design is specified as exclusion criteria in protocol.
Panaretto, K. S., Mitchell, M. R., Anderson, L., Larkins, S. L., Manessis, V., Buettner, P. G., Watson, D., Sustainable antenatal care services in an urban Indigenous community: The Townsville experience, Medical Journal of Australia, 187, 18-22, 2007	Does not compare different numbers of antenatal appointments
Quinlivan,J.A., Lam,L.T., Fisher,J., A randomised trial of a four-step multidisciplinary approach to the antenatal care of obese pregnant women, Australian and New Zealand Journal of Obstetrics and Gynaecology, 51, 141-146, 2011	Does not compare different numbers of antenatal appointments
Ridgeway, J. L., LeBlanc, A., Branda, M., Harms, R. W., Morris, M. A., Nesbitt, K., Gostout, B. S., Barkey, L. M., Sobolewski, S. M., Brodrick, E., Inselman, J., Baron, A., Sivly, A., Baker, M., Finnie, D., Chaudhry, R., Famuyide, A. O., Implementation of a new prenatal care model to reduce office visits and increase connectivity and continuity of care: Protocol for a mixed-methods study, BMC pregnancy and childbirth, 15 (1) (no pagination), 2015	Does not compare different numbers of antenatal appointments
Ross, L., Simkhada, P., Smith, W. C. S., Evaluating effectiveness of complex interventions aimed at reducing maternal mortality in developing countries, Journal of Public Health, 27, 331-337, 2005	Does not compare different numbers of antenatal appointments
Ross-McGill, H., Hewison, J., Hirst, J., Dowswell, T., Holt, A., Brunskill, P., Thornton, J. G., Antenatal home blood pressure monitoring: a pilot randomised controlled trial, BJOG: An International Journal of Obstetrics & Gynaecology, 107, 217-21, 2000	To measure recruitment to, compliance with, and the acceptability of a trial.
Rowe, R. E., Garcia, J., Social class, ethnicity and attendance for antenatal care in the United Kingdom: A systematic review, Journal of public health medicine, 25, 113-119, 2003	Does not compare different numbers of antenatal appointments
Rumbold, A. R., Cunningham, J., A review of the impact of antenatal care for Australian indigenous women and attempts to strengthen	Does not compare different numbers of antenatal appointments

Study	Reason for exclusion
these services, Maternal and child health journal, 12, 83-100, 2008	
Sawtell, M., Sweeney, L., Wiggins, M., Salisbury, C., Eldridge, S., Greenberg, L., Hunter, R., Kaur, I., McCourt, C., Hatherall, B., Findlay, G., Morris, J., Reading, S., Renton, A., Adekoya, R., Green, B., Harvey, B., Latham, S., Patel, K., Vanlessen, L., Harden, A., Evaluation of community-level interventions to increase early initiation of antenatal care in pregnancy: Protocol for the Community REACH study, a cluster randomised controlled trial with integrated process and economic evaluations, Trials, 19 (1) (no pagination), 2018	Does not compare different numbers of antenatal appointments
Senturk, M. B., Cakmak, Y., Soydan, S. D., Polat, M., Karateke, A., Time and number of antenatal visits in low socio-economic population: Outcomes and related factors, Journal of Clinical and Analytical Medicine, 7, 2016	Study design is specified as exclusion criteria in protocol.
Siddiqui, A. F., Late antenatal booking and its predictors among mothers attending primary health care centers in Abha, Saudi Arabia, Rawal Medical Journal, 41, 72-76, 2016	Study design is specified as exclusion criteria in protocol.
Tariq, S., Elford, J., Cortina-Borja, M., Tookey, P. A., The association between ethnicity and late presentation to antenatal care among pregnant women living with HIV in the UK and Ireland, AIDS Care - Psychological and Socio-Medical Aspects of AIDS/HIV, 24, 978-985, 2012	Does not compare different numbers of antenatal appointments
Tichelman, E., Peters, L., Oost, J., Westerhout, A., Schellevis, F. G., Burger, H., Noordman, J., Berger, M. Y., Martin, L., Addressing transition to motherhood, guideline adherence by midwives in prenatal booking visits: Findings from video recordings, Midwifery, 69, 76-83, 2019	Study design is specified as exclusion criteria in protocol.
Toohill, J., Turkstra, E., Gamble, J., Scuffham, P. A., A non-randomised trial investigating the cost-effectiveness of Midwifery Group Practice compared with standard maternity care arrangements in one Australian hospital, Midwifery, 28, e874-9, 2012	Does not compare different numbers of antenatal appointments
Vargas, L., Tristao, R. M., De Jesus, J. A., Effect of frequency of antenatal care visits on perinatal outcomes in a Brazilian newborns sample, European Journal of Pediatrics, 175 (11), 1659, 2016	Abstract only. No full paper available.
Villar, J., Khan-Neelofur, D., Patterns of routine antenatal care for low-risk pregnancy, Cochrane database of systematic reviews (Online), CD000934, 2000	Cochrane review of RCTs. Relevant RCTs extracted.
Vogel, J. P., Habib, N. A., Souza, J. P., Gulmezoglu, A. M., Dowswell, T., Carroli, G., Baaqeel, H. S., Lumbiganon, P., Piaggio, G., Oladapo, O. T., Antenatal care packages with	Does not compare different numbers of antenatal appointments

Study	Reason for exclusion
reduced visits and perinatal mortality: A secondary analysis of the WHO Antenatal Care Trial, Reproductive Health, 10 (1) (no pagination), 2013	
Walker, D. S., Day, S., Diroff, C., Lirette, H., McCully, L., Mooney-Hescott, C., Vest, V., Reduced frequency prenatal visits in midwifery practice: attitudes and use, Journal of Midwifery & Women's HealthJ Midwifery Womens Health, 47, 269-277, 2002	Does not compare different numbers of antenatal appointments
Walker, D. S., McCully, L., Vest, V., Evidence-based prenatal care visits: When less is more, Journal of Midwifery and Women's Health, 46, 146-151, 2001	Does not compare different numbers of antenatal appointments
Walker, D. S., Rising, S. S., Revolutionizing prenatal care: new evidence-based prenatal care delivery models, Journal of the New York State Nurses Association, 35, 18-21, 2004	Does not compare different numbers of antenatal appointments
Ward,N., Bayer,S., Ballard,M., Patience,T., Hume,R.F., Calhoun,B.C., Impact of prenatal care with reduced frequency of visits in a residency teaching program, Journal of Reproductive Medicine, 44, 849-852, 1999	Does not compare different numbers of antenatal appointments
Wondemagegn, A. T., Alebel, A., Tesema, C., Abie, W., The effect of antenatal care follow-up on neonatal health outcomes: A systematic review and meta-analysis, Public Health Reviews, 39 (1) (no pagination), 2018	Does not compare different numbers of antenatal appointments
Yaya, S., Bishwajit, G., Ekholuenetale, M., Shah, V., Kadio, B., Udenigwe, O., Timing and adequate attendance of antenatal care visits among women in Ethiopia, PLoS ONE, 12 (9) (no pagination), 2017	Does not compare different numbers of antenatal appointments
Young, D., Shields, N., Holmes, A., Turnbull, D., Twaddle, S., Aspects of antenatal care. A new style of midwife-managed antenatal care: costs and satisfaction, British journal of midwifery, 5, 540-545, 1997	Does not compare different numbers of antenatal appointments

Economic studies

A single economic search was undertaken for all topics included in the scope of this guideline. No economic studies were identified which were applicable to this review question. See supplementary material 2 for details.

Appendix L – Research recommendations

Research recommendations for review question: Is a reduced number of antenatal appointments as effective as standard care?

The committee made a research recommendation relating to this review question, about the effectiveness of different models of antenatal care. The details of the research recommendation can be found in appendix L in evidence review F Accessing antenatal care.