National Institute for Health and Care Excellence

Draft for consultation

Antenatal care

[H] Timing of first antenatal appointment

NICE guideline tbc

Evidence reviews underpinning recommendations 1.1.4 to 1.1.5

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

Disclaimer

The recommendations in this guideline represent the view of NICE, arrived at after careful consideration of the evidence available. When exercising their judgement, professionals are expected to take this guideline fully into account, alongside the individual needs, preferences and values of their patients or service users. The recommendations in this guideline are not mandatory and the guideline does not override the responsibility of healthcare professionals to make decisions appropriate to the circumstances of the individual patient, in consultation with the patient and/or their carer or guardian.

Local commissioners and/or providers have a responsibility to enable the guideline to be applied when individual health professionals and their patients or service users wish to use it. They should do so in the context of local and national priorities for funding and developing services, and in light of their duties to have due regard to the need to eliminate unlawful discrimination, to advance equality of opportunity and to reduce health inequalities. Nothing in this guideline should be interpreted in a way that would be inconsistent with compliance with those duties.

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ISBN:

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Timing of first antenatal appointment

Review question

When should the first antenatal booking appointment occur?

Introduction

The literature shows that outcomes for pregnant women and their babies are improved through effective antenatal care. The first antenatal care appointment involves an important assessment of needs and risks to determine whether a woman needs additional care and support during the pregnancy. However, the timing of when this appointment should occur has not yet been established. Therefore, this review aims to determine when the first antenatal booking appointment should occur.

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	First antenatal booking appointment (early antenatal care visit) at specific time point
Comparison	First antenatal booking appointment at a different time point

Outcomes	**Critical**
	• Severe maternal morbidity
	  ○ Admission to inpatient psychiatric services
	  ○ Maternal death
	  ○ Maternal ICU admission
	• Any fetal death after 16^{+0} weeks
	  ○ Fetal loss
	  ○ Late miscarriage
	  ○ Stillbirth
	  ○ Perinatal death
	• Fetal abnormalities
	Important
	• Admission to hospital
	• Uptake of antenatal services
	• Women's experience and satisfaction of care
	• Low birth weight <2.5kg

ICU: intensive care 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

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

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

No studies were identified which were applicable to this review question (and so there are no evidence tables in Appendix D). There were no studies identified therefore no meta-analysis was undertaken for this review (and so there are no forest plots in Appendix E).

Quality assessment of clinical outcomes included in the evidence review

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

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.

Excluded studies

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

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

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

The committee's discussion of the evidence

Interpreting the evidence

The outcomes that matter most

The committee agreed that severe maternal morbidity, and any fetal death and fetal abnormalities were critical outcomes. Admission to hospital, uptake of antenatal services, women's experience and satisfaction of care, and low birth weight were important outcomes.

The quality of the evidence

No evidence was identified for this review question.

Benefits and harms

Since there was no evidence identified for when the first antenatal booking appointment should occur, the committee did not change the recommendation from the 2008 NICE guideline on antenatal care for uncomplicated pregnancies (CG62) stating the booking appointment should occur by 10 weeks' gestational age. The committee acknowledged that this also aligns with the early pregnancy screening programmes recommended by the UK National Screening Committee (NSC). The committee discussed that it is important to have appointments early enough that information about lifestyle factors such as smoking cessation can be shared early on in the pregnancy. Supporting women to stop smoking early in pregnancy can have significant benefits. The booking appointment is an opportunity to assess medical, obstetric and social risk factors which then enables early management and care planning according to the woman's individual situation. Furthermore, the committee were aware of qualitative evidence (not included in this review) that suggests women desire more information earlier on in their pregnancy. Therefore, balancing the need for early contact with healthcare professionals against possible harms in terms of excess appointment and treatment burden for women the committee recommended offering a booking appointment by 10+0 weeks.

Based on their experience, the committee discussed that some women have their booking appointment much later, for example at 14 gestational weeks. The committee were aware of literature suggesting that women from ethnic minorities, or women from socially deprived areas were more likely to start their antenatal care later. This could be due to difficulty accessing antenatal care or limited knowledge of the antenatal care services. Based on the committee's knowledge and experience starting antenatal care later may lead to worse outcomes because the early pregnancy screenings, risk assessments and information sharing has not been done. Therefore, the committee made a consensus recommendation that women who have been referred to or contact antenatal care later than 9+0 weeks should be offered a booking appointment within two weeks of first contact, if possible, so that their antenatal care can be started swiftly. The committee agreed that this may be difficult for services to organise but the recommendation gives a clear steer to what the aim should be.

The committee discussed that there was no new evidence to change from the existing recommended practice, so the committee made a research recommendation about the effectiveness of different models of antenatal care, including the ideal timing of the booking appointment. The details of the research recommendation can be found in appendix L in evidence review F Accessing antenatal care.

Cost effectiveness and resource use

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

There was no evidence to inform the timing of the booking appointment, therefore, the committee had no reason to change current practice. Whilst the vast majority of women present at or before 9 gestational weeks it was noted that a sizeable proportion of women present later. It would require some flexibility from clinics to schedule these groups an appointment within two weeks. However, as no additional appointments are required there should be no additional resource use.

References

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

Appendices

Appendix A – Review protocols

Review protocol for review question: When should the first antenatal booking appointment occur?

Table 2: Review protocol

Field (based on PRISMA-P)	Content
Review question	When should the first antenatal booking appointment occur?
Type of review question	Intervention
Objective of the review	The aim of this review is to identify the most effective timing for the first antenatal booking appointment and whether there are any harms associated with a particular time for the booking appointment.
Eligibility criteria – population	All pregnant women
Eligibility criteria – intervention(s)	First antenatal booking appointment at specific time point Note: first antenatal appointment also referred to as 'early antenatal care visit'.
Eligibility criteria – comparator(s)	First antenatal booking appointment at a different time point

Outcomes and prioritisation	**Critical**
	• Severe maternal morbidity
	  ○ Admission to inpatient psychiatric services
	  ○ Maternal death
	  ○ Maternal ICU admission
	Note: data for these outcomes will be pooled.
	• Any fetal death after 16^{+0} weeks
	  ○ Fetal loss
	  ○ Late miscarriage
	  ○ Stillbirth
	  ○ Perinatal death
	Note: data for these outcomes will be pooled
	• Fetal abnormalities
	
	Important
	• Admission to hospital
	• Uptake of antenatal services

Field (based on PRISMA-P)	Content
	• Women's experience and satisfaction of care • Low birth weight <2.5kg Note: this outcome includes intrauterine growth restriction (IUGR), pre-term birth, and small for gestational age (SGA). 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 • Randomised or quasi-randomised controlled trials (individual or cluster) If no RCT data are available for a question, evidence from the following study designs will be considered: • Non-randomised controlled trials • Prospective cohort studies • Retrospective cohort studies Note: Cohort studies will only be included if they adjust for all of the following: • Comorbidities • Maternal age • Socioeconomic status For further details, see the algorithm in appendix H, Developing NICE guidelines: the manual.
Other inclusion exclusion criteria	**Exclusion** POPULATION: • Studies that only include pregnant women with known medical comorbidities will be excluded. 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**

Field (based on PRISMA-P)	Content
	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	In the presence of heterogeneity, the following subgroup analyses will be conducted: • History of adverse pregnancy (History; No history) • Parity (Nulliparous; parous) These subgroup factors will be used as additional confounding factors to assess risk of bias of any included cohort studies using the relevant checklist.
Selection process – duplicate screening/selection/analysis	Studies included in the Antenatal care for uncomplicated pregnancies guideline (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 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: 1995 (justified because 12 weeks scan not yet routine; no CG62 search performed for this question) • 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 Antenatal care for uncomplicated pregnancies guideline (CG 62), which will be taken down in due course. The following recommendations are on antenatal appointment timing during pregnancy from previous antenatal care guidelines of uncomplicated pregnancies (CG 62) first published in 2008: Appendix D: 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** 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

Field (based on PRISMA-P)	Content
	• 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 • 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

Field (based on PRISMA-P)	Content
	• 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: o crown–rump measurement between 10 weeks 0 days and 13 weeks 6 days o head circumference if crown–rump length is above 84 millimetres • Down's syndrome screening using: o 'combined test' at 11 weeks 0 days to 13 weeks 6 days o 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** 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.

Field (based on PRISMA-P)	Content
	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 • 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 • 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

Field (based on PRISMA-P)	Content
	• 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 G (economic evidence tables).
Data items – define all variables to be collected	For details please see evidence tables in appendix D (clinical evidence tables) or G (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 • 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 in the full guideline.

Field (based on PRISMA-P)	Content
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.

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

Appendix B – Literature search strategies

Literature search strategies for review question: When should the first antenatal booking appointment occur?

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

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/
43	(letter or comment*).ti.

#	Searches
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
#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

#	Searches
#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

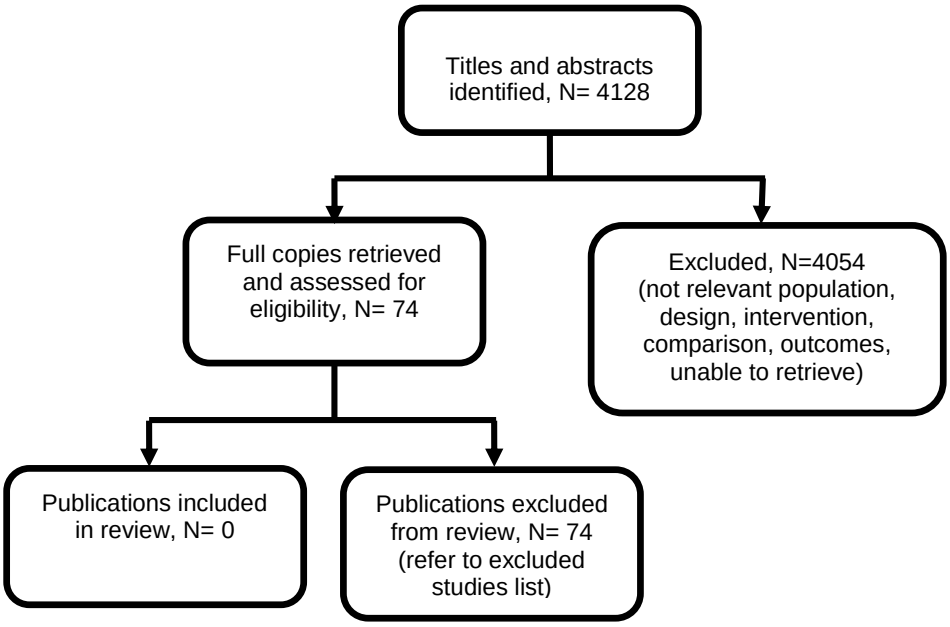
Database(s): CRD: Database of Abstracts of Reviews of Effects (DARE), HTA Database
Date of last search: 8th September 2020

#	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: When should the first antenatal booking appointment occur?

Figure 1: Study selection flow chart



Appendix D – Clinical evidence tables

Clinical evidence tables for review question: When should the first antenatal booking appointment occur?

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

Appendix E – Forest plots

Forest plots for review question: When should the first antenatal booking appointment occur?

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

Appendix F – GRADE tables

GRADE tables for review question: When should the first antenatal booking appointment occur?

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

Appendix G – Economic evidence study selection

Economic evidence study selection for review question: When should the first antenatal booking appointment occur?

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: When should the first antenatal booking appointment occur?

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

Appendix I – Economic evidence profiles

Economic evidence profiles for review question: When should the first antenatal booking appointment occur?

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

Appendix J – Economic analysis

Economic evidence analysis for review question: When should the first antenatal booking appointment occur?

No economic analysis was conducted for this review question.

Appendix K – Excluded studies

Excluded clinical and economic studies for review question: When should the first antenatal booking appointment occur?

Clinical studies

Table 3: 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 discuss timing of booking appointment.
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 discuss timing of booking appointment.
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 discuss timing of booking appointment.
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 discuss timing of booking appointment.
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.
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	Does not discuss timing of booking appointment.
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 discuss timing of booking appointment.
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	Does not discuss timing of booking appointment.

Study	Reason for exclusion
Medicaid Members, Telemedicine journal and e-health : the official journal of the American Telemedicine Association, 23, 891-898, 2017	
Butler, M. M., Sheehy, L., Kington, M. M., Walsh, M. C., Brosnan, M. C., Murphy, M., Naughton, C., Drennan, J., Barry, T., Evaluating midwife-led antenatal care: choice, experience, effectiveness, and preparation for pregnancy, Midwifery, 31, 418-425, 2015	Does not discuss timing of booking appointment.
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 & Gynecologya, 221, 638.e1-638.e8, 2019	Does not discuss timing of booking appointment.
Candy, B., Clement, S., Sikorski, J., Wilson, J., Antenatal visits, Practising Midwife, 3, 21-4, 2000	Does not discuss timing of booking appointment.
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 discuss timing of booking appointment.

Study	Reason for exclusion
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., 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	HTA assessing the use of a new application of technology.
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 discuss timing of booking appointment.
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 discuss timing of booking appointment.
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 discuss timing of booking appointment.
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	Abstract only. No full paper available.

Study	Reason for exclusion
booking in The Netherlands, Reproductive Sciences, 1), 209A, 2012	
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 discuss timing of booking appointment.
Hofmeyr, G. J., Hodnett, E. D., Antenatal care packages with reduced visits and perinatal mortality: A secondary analysis of the WHO antenatal care trial - Comentary: Routine antenatal visits for healthy pregnant women do make a difference, Reproductive health, 10 (1) (no pagination), 2013	Does not discuss timing of booking appointment.
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 discuss timing of booking appointment.
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 discuss timing of booking appointment.
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	Does not discuss timing of booking appointment.
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 discuss timing of booking appointment.
Loughnan, B. A., Robinson, P. N., Ethnicity and late booking in an urban obstetric population, Public Health, 123, 723-4, 2009	Does not discuss timing of booking appointment.
Magriples,U., Kershaw,T.S., Rising,S.S., Massey,Z., Ickovics,J.R., Prenatal health care	Does not discuss timing of booking appointment.

Study	Reason for exclusion
beyond the obstetrics service: utilization and predictors of unscheduled care, American Journal of Obstetrics and Gynecology, 198, 75-77, 2008	
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 discuss timing of booking appointment.
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	Does not discuss timing of booking appointment.
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	Does not discuss timing of booking appointment.
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 discuss timing of booking appointment.
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.
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	Does not discuss timing of booking appointment.
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 discuss timing of booking appointment.
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 discuss timing of booking appointment.
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	Does not discuss timing of booking appointment.

Study	Reason for exclusion
Journal of Obstetrics and Gynaecology, 51, 141-146, 2011	
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 discuss timing of booking appointment.
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 discuss timing of booking appointment.
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 discuss timing of booking appointment.
Rumbold, A. R., Cunningham, J., A review of the impact of antenatal care for Australian indigenous women and attempts to strengthen these services, Maternal and child health journal, 12, 83-100, 2008	Does not discuss timing of booking appointment.
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 discuss timing of booking appointment.
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.
Sikorski, J., Wilson, J., Clement, S., Das, S., Smeeton, N., A randomised controlled trial	Does not discuss timing of booking appointment.

Study	Reason for exclusion
comparing two schedules of antenatal visits: the antenatal care project, BMJ, 312, 546-53, 1996	
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 discuss timing of booking appointment.
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 discuss timing of booking appointment.
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 reduced visits and perinatal mortality: A secondary analysis of the WHO Antenatal Care Trial, Reproductive Health, 10 (1) (no pagination), 2013	Does not discuss timing of booking appointment.
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	Does not discuss timing of booking appointment.
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 discuss timing of booking appointment.
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 discuss timing of booking appointment.
Walker, D. S., Rising, S. S., Revolutionizing prenatal care: new evidence-based prenatal	Does not discuss timing of booking appointment.

Study	Reason for exclusion
care delivery models, Journal of the New York State Nurses Association, 35, 18-21, 2004	
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 discuss timing of booking appointment.
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 discuss timing of booking appointment.
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 discuss timing of booking appointment.
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 discuss timing of booking appointment.

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: When should the first antenatal care appointment occur?

The committee made a research recommendation about the 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.