NHS

National Institute for Clinical Excellence

National Institute for Clinical Excellence

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INHERITED *Clinical Guideline* D

NHS

National Institute for Clinical Excellence

Induction of Labour

June 2001

Clinical Guideline D
Induction of Labour

Issue date: June 2001
Review date: January 2004

Ordering Information
Copies of this Guideline can be obtained from the NHS Response Line by telephoning 0870 1555 455 and quoting ref. 24010. A patient version of this document, *About induction of labour*, can also be obtained by quoting ref. 24011.

Distribution of Guidelines

This document has been circulated to the following:
- Health Authority Chief Executives in England and Wales
- NHS Trust Chief Executives in England and Wales
- PCG Chief Executives
- Local Health Group General Managers
- Medical and Nursing Directors in England and Wales
- Consultant Obstetricians and Gynaecologists in England and Wales
- Midwives in England and Wales
- NHS Director Wales
- Chief Executive of the NHS in England
- NHS Executive Regional Directors
- Special Health Authority Chief Executives
- Community Health Councils in England and Wales
- Patient advocacy groups
- Commission for Health Improvement
- NHS Clinical Governance Support Team
- Chief Medical, Nursing Officers and Pharmaceutical Officers in England and Wales
- Medical Director & Head of NHS Quality – National Assembly for Wales
- Clinical Effectiveness Support Unit - Wales
- Representative bodies for health services, professional organisations and statutory bodies, Royal Colleges

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This Guidance is written in the following context:
This Guidance represents the view of the Institute, which was arrived at after careful consideration of the available evidence. Health professionals are expected to take it fully into account when exercising their clinical judgment. This Guidance does not, however, override the individual responsibility of health professionals to make appropriate decisions in the circumstances of the individual woman, in consultation with her and, where appropriate and necessary, her guardian or carer.

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Contents

This guideline is a part of the Inherited Clinical Guidelines work programme. It was commissioned by the Department of Health before the Institute was formed in April 1999. It has followed closely the development brief that was agreed at the time of commissioning. The developers have worked with the Institute to ensure, in the time available, that the guideline has been subjected to validation and to consultation with stakeholders. However it has not been possible to subject it to the full guideline development process that the Institute has now adopted.

1. Evidence

1.1 The definitions of the types of evidence used in this guideline originate from the US Agency for Healthcare Policy and Research.

Table 1 Levels of evidence

Level	Type of evidence
Ia	Evidence obtained from systematic review of meta-analysis of randomised controlled trials
Ib	Evidence obtained from at least one randomised controlled trial
IIa	Evidence obtained from at least one well-designed controlled study without randomisation
IIb	Evidence obtained from at least one other type of well-designed quasi-experimental study
III	Evidence obtained from well-designed non-experimental descriptive studies, such as comparative studies, correlation studies and case studies
IV	Evidence obtained from expert committee reports or opinions and/or clinical experience of respected authorities.

The grading scheme used was based on a scheme formulated by the Clinical Outcomes Group (COG) of the NHS Executive.

Table 2 Grading of recommendations

The recommendations were graded as follows:

- **A** Requires at least one randomised controlled trial as part of a body of literature of overall good quality and consistency addressing the specific recommendation (evidence levels Ia, Ib)
- **B** Requires the availability of well-conducted clinical studies but no randomised clinical trials on the topic of the recommendation (evidence levels IIa, IIb, III)
- **C** Requires evidence obtained from expert committee reports or opinions and/or clinical experience of respected authorities. Indicates an absence of directly applicable clinical studies of good quality (evidence level IV)

Good practice points

- ✔ Recommended good practice based on the clinical experience of the Guideline Development Group

2. Guidance

For the purposes of this guideline, induction of labour is defined as an intervention designed to artificially initiate uterine contractions leading to progressive dilatation and effacement of the cervix and birth of the baby. This includes both women with intact membranes and women with spontaneous rupture of the membranes but who are not in labour. As with any other intervention induction of labour may have unwanted side-effects. Induction of labour is indicated when it is agreed that the fetus or mother will benefit from a higher probability of a healthy outcome than if birth is delayed. The process of induction of labour should only be considered when vaginal delivery is felt to be the appropriate route of delivery.

Induction of labour is a common procedure, about 20% of pregnant women will have labour induced for a variety of reasons. Induction does not usually involve just a single intervention but is a complex set of interventions and as such presents challenges for both clinicians and mothers.

The guideline remit includes :

- Conditions which may affect the safety and efficacy of induction of labour e.g. previous caesarean section.
- Indications for induction of labour for healthy women with an uncomplicated pregnancy are considered, e.g. prolonged pregnancy, prelabour rupture of membranes at term. Variation in this policy for specific conditions are also included e.g. diabetes.

The risks and benefits of induction of labour as an intervention for specific clinical conditions arising in pregnancy are not included e.g. pre-eclampsia.

2.1 Care during induction of labour

Women centred care

Women must be able to make informed choices regarding their care or treatment via access to evidence based information. These choices should be recognised as an integral part of the decision making process. C

Place of induction

For women who are healthy and have had an otherwise uncomplicated pregnancy, induction of labour with vaginal prostaglandin E2 agents can be conducted on antenatal wards, prior to the active phase of labour. C

When undertaking induction of labour of women with recognised risk factors (e.g. suspected fetal growth compromise, previous caesarean section or high parity) the induction process should not occur on an antenatal ward. C

Fetal surveillance and induction of labour

Wherever induction of labour occurs, facilities should be available for continuous uterine and fetal heart rate monitoring. C

Fetal wellbeing should be confirmed immediately prior to induction of labour. C

Following induction of labour with vaginal prostaglandins (PGE2) fetal well-being should be established once contractions are detected or reported. C

For women who are healthy and have had an otherwise uncomplicated pregnancy the assessment of fetal well-being following the administration of vaginal prostaglandins should comprise of an initial assessment with continuous electronic fetal monitoring (EFM) and once normality is confirmed intermittent monitoring can be used. C

Where oxytocin is being used for induction or augmentation of labour continuous electronic fetal monitoring should be used. C

Uterine hypercontractility with induction agents

For the definition of uterine hypercontractility used in the guideline see Appendix E.

Prolonged use of maternal facial oxygen therapy may be harmful to the fetus and should be avoided. There is no research evidence evaluating the benefits or risks associated with the short-term use of maternal facial oxygen therapy in cases of suspected fetal compromise. C

In cases of uterine hypercontractility with a suspicious or pathological cardiotocograph (CTG), secondary to oxytocin infusions, the oxytocin infusion should be decreased or discontinued. (See Appendix E for definition of suspicious and pathological.) B

In the presence of abnormal FHR patterns and uterine hypercontractility (not secondary to oxytocin infusion) tocolysis should be considered. A suggested regime is **subcutaneous terbutaline 0.25 milligrams.** A

In cases of suspected or confirmed acute fetal compromise, delivery should be accomplished as soon as possible, taking account of the severity of the FHR abnormality and relevant maternal factors. The accepted standard has been that ideally this should be accomplished within 30 minutes. B

Care of higher risk pregnancies

When undertaking induction of labour of women with recognised risk factors (e.g. suspected fetal growth compromise, previous caesarean section and high parity): C

- The clinical discussion regarding the timing and method of induction of labour should be undertaken at consultant level.
- The induction process should not occur on an antenatal ward.

2.2 Indications for induction of labour

Prolonged pregnancy

- Population studies indicate that the risk of stillbirth increases from 1 per 3000 ongoing pregnancies at 37 weeks to 3 per 3000 ongoing pregnancies at 42 weeks to 6 per 3000 ongoing pregnancies at 43 weeks.

- A policy of offering routine induction of labour after 41 weeks reduces perinatal mortality without increasing the caesarean section rate.

- Data from a cohort study revealed that at 40 weeks only 58% of the population had delivered. This increased to 74% by 41 weeks and to 82% by 42 weeks. A policy of induction of labour prior to 41 weeks would generate an increase in workload without reducing perinatal mortality.

An ultrasound to confirm gestation should be offered before 20 weeks gestation as this reduces the need for induction for perceived post term pregnancy. A

Women with uncomplicated pregnancies should be offered induction of labour beyond 41 weeks. A

From 42 weeks women who decline induction of labour should be offered increased antenatal monitoring consisting of a twice weekly CTG and ultrasound estimation of maximum amniotic pool depth. A

Diabetes in pregnancy

UK population studies show a four or fivefold increase in perinatal mortality rate (including an increased rate of late fetal death) in pregnancies in women with diabetes in pregnancy compared to the general population.

Women who have pregnancies complicated by diabetes should be offered induction of labour prior to their estimated date for delivery. C

Induction of labour in the presence of prelabour rupture of the membranes (PROM)

- Prelabour rupture of the membranes (PROM) occurs in 6-19% of term pregnancies.

- The risks of PROM at term relate to maternal/neonatal infection and prolapsed cord. Epidemiological data on time interval from PROM to spontaneous labour suggests that most (86%) women go into spontaneous labour within 24hrs of rupturing their membranes. The rate of spontaneous labour after this is about 5% per day.

- As the time between the rupture of the membranes and the onset of labour increases, so do the risks of maternal and fetal infection. Induction of labour reduces these risks.

Women with prelabour rupture of the membranes (PROM) at term (>37 weeks) should be offered a choice of immediate induction of labour or expectant management. A

Expectant management of women with prelabour rupture of the membranes at term should not exceed 96 hours following membrane rupture. A

Multifetal pregnancy, macrosomia and a history of precipitate labour were also considered by the guideline development group for inclusion within this section, but there was insufficient evidence upon which to base any recommendations.

Induction of labour for maternal request prior to 41 weeks

Where resources allow, maternal request for induction of labour should be considered when there are compelling psychological or social reasons and the woman has a favourable cervix. ✔

2.3 Method of induction of labour in specific clinical situations

Membrane sweeping

Prior to formal induction of labour, women should be offered sweeping of the membranes. A

When membrane sweeping is proposed discussions should include information which informs women that membrane sweeping: A

- is not associated with an increase in maternal or neonatal infection.
- is associated with increased levels of discomfort during the procedure and bleeding.

Oxytocin compared to prostaglandins for induction of labour

Prostaglandins should be used in preference to using oxytocin when induction of labour is undertaken in either nulliparous or multiparous women with intact membranes regardless of their cervical favourability. A

Either prostaglandins or oxytocin may be used when induction of labour is undertaken in nulliparous or multiparous women who have ruptured membranes, regardless of cervical status, as they are equally effective. A

Comparison of intracervical and intravaginal prostaglandins (PGE2)

When induction of labour is undertaken with prostaglandins intravaginal PGE2 should be used in preference to intracervical preparations as they are equally effective and administration of vaginal PGE2 is less invasive. A

Comparison of different preparations of vaginal prostaglandin (PGE2)

Given that they are clinically equivalent, when induction of labour is undertaken with vaginal PGE2 preparations, vaginal tablets should be considered in preference to gel formulations. A

Recommended regimens for vaginal PGE2 preparations include: C

- PGE2 tablets:
  - 3 milligrams PGE2 6-8 hourly.
  - The maximum total dose is 6 milligrams for all women.

- PGE2 gels:
  - 2 milligrams PGE2 in nulliparous women with an unfavourable cervix. (Bishops score <4. See Appendix D for definition of Bishops Score)
  - 1 milligram for all other women.
  - In either, a second dose of 1-2 milligrams can be administered 6 hours later.
  - The maximum dose is 4 milligrams PGE2 for nulliparous women with an unfavourable cervix and 3 milligrams for all other women.

Comparison of different regimens of oxytocin administration

Oxytocin should not be started for 6 hours following administration of vaginal prostaglandins. C

In women with intact membranes amniotomy should be performed where feasible prior to commencement of an infusion of oxytocin. C

When induction of labour is undertaken with oxytocin the recommended regimen is: C

- A starting dose of 1-2 milliunits per minute.
- Increased at intervals of 30 minutes or more.
- The minimum dose possible of oxytocin should be used and this should be titrated against uterine contractions aiming for a maximum of 3-4 contractions every 10 minutes.
- Adequate contractions may be established at 12 milliunits per minute.
- In the summary of product characteristics (SPC) the licensed maximum dose is 20 milliunits per minute.
- If higher doses are used the maximum dose used should not exceed 32 milliunits per minute.

Local protocols for delivery of oxytocin for induction of labour should: C

- specify and use the dose of oxytocin being delivered (milliunits per minute or mU/min) in preference to the volume of fluid being infused (millilitres per minute or ml/min).
- be delivered through a syringe driver or via an infusion pump with a non-return valve.

To reduce error, a standard dilution should always be used. Suggested standardised dilutions and dose regimens include: C

- 30IU Oxytocin in 500mls of normal saline, hence 1ml/hr = 1 milliunit Oxytocin per minute.
- 10IU Oxytocin in 500mls of normal saline, hence 3mls/hr = 1 milliunit Oxytocin per minute.

Table 3: Suggested standardised dilutions and dose regimens C

Time after starting (mins)	Oxytocin Dose (mU/min)	Volume infused (mls/hour)	
		Dilution 30IU Oxytocin in 500mls normal Saline	Dilution 10IU Oxytocin in 500mls normal Saline
0	1	1	3
30	2	2	6
60	4	4	12
90	8	8	24
120	12	12	36
150	16	16	48
180	20	20	60
210	24	24	72
240	28	28	84
270	32	32	96

Doses highlighted in green are quantities above those referred to in the SPC of 20 milliunits per minute.

3. Full Guideline

3.1 These recommendations are derived from the guideline entitled "Induction of labour" commissioned from the Clinical Effectiveness Support Unit of the Royal College of Obstetricians and Gynaecologists. It is available on their website www.rcog.org.uk, on the Institute's website: www.nice.org.uk and on the National Electronic Library for Health's website: www.nelh.nhs.uk. The Guideline developers are listed in Appendix A.

3.2 This guideline was commissioned by the Department of Health before the Institute was formed in April 1999. It has followed closely the development brief which was agreed at the time of commissioning. The developers have worked with the Institute to ensure, in the time available, that the guideline has been the subject of validation and consultation with stakeholders. However, it has not been possible to subject it to the full guideline development process which the Institute has now adopted.

4. Scope

4.1 Clinical guidelines have been defined as systematically developed statements, which assist clinicians and patients in making decisions about appropriate treatment for specific conditions. The Guideline Development Group has developed this guideline with the following aims:

- To evaluate the role of induction of labour with a live fetus within a variety of clinical situations.
- To evaluate and compare the various methods of induction of labour of women in relation to maternal and fetal outcome measures.
- To consider the resource implications of the use of induction of labour.

5. Implementation in the NHS

5.1 The implementation of this guideline should be undertaken within the strategic framework of the health improvement plans for each local health community.

5.2 Local health communities will need to review existing service provision against this guidance. This review should result in a strategy which identifies the resources required to implement fully the recommendations set out in Section 2 of the guidance, the people and processes involved and the timeline over which full implementation is envisaged.

- Relevant local clinical guidelines and protocols for IOL should be reviewed in the light of this guidance.
- Clinicians with responsibility for the care of women during pregnancy should review their current practice in line with the recommendations set out in Section 2.
- The following audit criteria can be used to support the evaluation of clinical practice, and continuous improvement in the care of women during pregnancy:
  - Number and percentage of women who have induction of labour.
  - The main indication and mode of delivery for women who are induced.
- This information should be incorporated into local audit data recording systems and consideration given (if not already in place) to the establishment of appropriate categories in routine electronic record-keeping systems.

- Further local evaluation of the use of induction of labour may be needed, and could include clinical audit of aspects of process (e.g. methods used during IOL, appropriate gestational age assessment), and outcomes (e.g. caesarean section rates, serious maternal morbidity, maternal satisfaction and neonatal outcomes such as serious neonatal morbidity and perinatal death).

- Prospective clinical audit programmes should record the proportion of treatments adhering to this guidance. Such programmes are likely to be more effective in improving patient care when they form part of the organisation's formal clinical governance arrangements and where they are linked to specific postgraduate activities.

6. Future research recommendations

6.1 The following further research is recommended.

Adequately powered randomised controlled trials reporting relevant clinical outcomes in specific clinical groups are needed to:

- Evaluate further the effectiveness of different vaginal prostaglandin E2 formulations for induction of labour.

- Evaluate the risks and benefits of vaginal/oral misoprostol for induction of labour using commercially produced tablets of appropriate dose.

- Evaluate the risks and benefits of induction of labour for women whose pregnancies are complicated by:
  - Diabetes (divided according to aetiology of diabetes)
  - Multifetal pregnancy
  - Suspected fetal growth compromise
  - Macrosomia

6.2 Evaluate screening for abnormal vaginal colonisation in cases of prelabour rupture of the membranes at term in the UK.

6.3 Further studies are needed to develop and standardise measures of maternal satisfaction, attitude and responses to induction of labour.

7. Related NICE Guidance

7.1 Electronic fetal monitoring – issue date May 2001

7.2 Caesarean Section Guideline – provisional completion in Winter 2002

8. Review Date

8.1 The Institute's Guidance Executive will consider changes in the evidence base for this guideline in January 2004. A decision will be made as to the need for and the extent of any update.

Appendix A

Guideline development group

The Guideline Development Group is a multiprofessional team brought together on a project basis, to consider the evidence of clinical and cost effectiveness and develop the guideline.

Professor A A Calder
Chairman

Mrs B Beech Lawrence
Association for Improvements in the Maternity Services

Mr R Cookson
Health Economist from the University of East Anglia

Dr P Crowley
Royal College of Obstetricians and Gynaecologists

Dr P Danielian
British Maternal Fetal Medicine Society

Dr A Farebrother
Faculty of Public Health Medicine

Mr A Foulkes
Royal College of General Practitioners

Mr P Harris
Help for Health Trust

Dr M Kilby
British Association of Perinatal Medicine

Dr G Lewis
Department of Health observer

Professor J Neilson
Royal College of Obstetricians and Gynaecologists

Miss J Rogers
Royal College of Midwives

Ms J M Thomas MRCOG
Director, Clinical Effectiveness Support Unit, Royal College of Obstetricians and Gynaecologists

Mr A Kelly MRCOG
Research Fellow, Clinical Effectiveness Support Unit, Royal College of Obstetricians and Gynaecologists

Ms J Kavanagh
Research Fellow, Clinical Effectiveness Support Unit, Royal College of Obstetricians and Gynaecologists

INHERITED Clinical Guideline D

NHS

National Institute for Clinical Excellence

Induction of Labour

Clinical Practice Algorithm

June 2001

Practice algorithm for induction of labour

- Offer booking scan at <20 weeks by LMP
- Confirm expected date of delivery prior to induction

- Induction should only be considered when vaginal delivery is felt to be the most appropriate mode of delivery
- Due consideration should be given to maternal preferences and priorities prior to commencement of induction

Pregnancy complications present?

No

Review at 40+ weeks

Offer
- Membrane sweep
- Induction after 41 weeks

Yes

Consideration of individual woman's clinical condition

Offer
- Membrane sweep
- Induction at appropriate gestation

Augment discussions where possible with written information

Offer of induction declined from 42 weeks

Initiate serial monitoring at 42 weeks
- Measurement of single deepest pool of liquor
- Twice weekly CTG

Propose induction if monitoring abnormal

Modified Bishop's Score

	Pelvic score			
Cervical feature	**0**	**1**	**2**	**3**
Dilatation (cm)	<1	1-2	2-4	>4
Length of cervix (cm)	>4	2-4	1-2	<1
Station (relative to ischial spines)	-3	-2	-1/0	+1/+2
Consistency	Firm	Average	Soft	-
Position	Posterior	Mid/Anterior	-	-

CTG = Cardiotocograph LMP = Last menstrual period IV = Intravenous PGE_2 = Prostaglandin E_2

Method of induction of labour

Intact membranes

Irrespective of parity or cervical status

Consider

- Intravaginal PGE_2 tablet or gel

Ruptured membranes

Irrespective of parity or cervical status

Consider either

- Intravaginal PGE_2 tablet or gel
- IV oxytocin (in the presence of ruptured membranes, spontaneous or amniotomy)

Although parity does not appear to effect the choice of method of induction of labour it should influence the dosage of drugs used

Induction with vaginal PGE_2 agents

- Consideration should be given to PGE_2 tablets in preference to gel where possible
- Oxytocin not to be started within 6 hours of last PGE_2

Intravaginal PGE_2 tablet

- 3 milligram PGE_2 tablet 6-8 hourly
- Maximum dose 6 milligrams

Intravaginal PGE_2 gel

- Nulliparous women with a modified Bishops score <4 give 2 milligrams
- All other patients give 1 milligrams
- Repeat dose of 1-2 milligrams 6 hourly
- Maximum dose 4 milligrams

Induction with oxytocin

- Treatment regimes: milliunits per minute not millilitres per minute
- 30 iu in 500mls normal saline
- 1 millilitres/hr = 1 milliunits/min
- Deliver via either syringe driver or infusion pump with non-return valve
- Oxytocin performance optimised with ruptured membranes

Oxytocin (in the presence of ruptured membranes)

Time after starting (minutes)	Dose delivery (milliunits/ minute)
0	1
30	2
60	4
90	8
120	12
150	16
180	20
210	24
240	28
270	32

- Most women should have adequate contractions at 12 milliunits per minute
- Trials have used doses up to 32 milliunits per minute
- Maximum licensed dose is 20 milliunits per minute
- If regular contraction not established after TOTAL of 5 iu (5 hours on suggested regimen) then induction should be stopped

INHERITED *Clinical Guideline* D

Induction of Labour

Issue date: June 2001 **Review date:** January 2004

The algorithm overleaf forms part of the guideline referenced above. The algorithm draws directly on the evidence presented in the Guideline and should where necessary be interpreted with reference to the full guideline.

Copies of the guideline can be obtained free of charge from the Institute's website **(www.nice.org.uk)**, and the NHS Response Line by telephoning 0870 1555 455 and quoting ref. 24010. A patient version of this document, *About Induction of Labour*, can also be obtained by quoting ref. 24011 for an English only version or ref. 24012 for an English/Welsh version.

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Appendix B

Guidelines Advisory Committee at NICE

The Guidelines Advisory Committee (GAC) is a standing committee of the Institute. It has responsibility for agreeing the scope and commissioning brief for clinical guidelines and for monitoring progress and methodological soundness. The GAC considers responses from stakeholders and advises the Institute on the acceptability of the guidelines it has commissioned. The members of the GAC are:

Stephanie A Amiel
RD Lawrence Professor of Diabetic Medicine,
Kings College

Mr. Charles Collins
Chairman, Clinical Effectiveness Committee
Royal College of Surgeons

Joyce Cormie
Consumer Representative

Professor Mike Drummond
Director, Centre for Health Economics (CHE)
University of York

Chairman: Professor Martin Eccles
Professor of Clinical Effectiveness,
University of Newcastle upon Tyne

David Edwards
Chief Executive,
Cardiff and Vale NHS Trust

Vice Chair: Professor Gene Feder
Professor of Primary Care Research and Development
Barts and The London Queen Marys School of Medicine and Dentistry

Professor Jeremy Grimshaw
Professor of Health Services Research and Programme Director in the Health Services Research Unit, University of Aberdeen

Dr Gill Harvey
Director Quality Improvement Programme,
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Judy Mead
Head of Clinical Effectiveness, Chartered Society of Physiotherapy

Juliet Miller
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Scottish Intercollegiate Guidelines Network

Dr Chaand Nagpaul
General Practitioner,
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Professor Robert Shaw
President,
The Royal College of Obstetrics and Gynaecology

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Amanda Wilde
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Fiona Wise
Chief Executive,
Stoke Mandeville Trust

Carol Youngs
Assistant Director,
Contact a Family

Dr John Young
Medical Director,
MSD

Appendix C

About Induction of Labour – Information for pregnant women, their partners and their families

The patient information in this appendix has been designed to support the production of your own information leaflets. You can download it from our website at www.nice.org.uk where it is available in English and Welsh. If you would like printed copies of the leaflets please ring the NHS Response Line on 0870 1555 455 and quote reference number 24011 for the English patient leaflet and 24012 for the bi-lingual patient leaflet.

About this booklet

This booklet:

- Is for pregnant women, their partners and their families
- Gives information to help you make choices about induction of labour
- Provides information on the main reasons for induction of labour
- Provides information on the best methods for induction of labour
- Is based on a national evidence based clinical guideline on induction of labour

About clinical guidelines

Clinical guidelines are recommendations for good practice and exist to help patients and their healthcare team make the right decisions about health care. The guidelines are developed by teams of healthcare professionals, patients and scientists who look at the best evidence about care for a particular condition.

The advice in this booklet is adapted from a guideline produced by the Royal College of Obstetricians and Gynaecologists (RCOG) on behalf of the National Institute for Clinical Excellence (NICE) for the NHS in England and Wales.

Everyone has the right to be fully informed and to share in decision-making about health care. Health care staff should respect and take into account the wishes of the people in their care. Guidelines are recommendations for good practice. There may be good reasons why your treatment differs from the recommendations in this booklet, depending on your individual circumstances and wishes.

The National Institute for Clinical Excellence (NICE) is a part of the NHS. It produces guidance for both the NHS and patients on medicines, medical equipment and clinical procedures and where they should be used.

What is induction of labour?

During pregnancy your baby is surrounded by a fluid filled membrane (sac) which offers protection whilst he or she is developing in the uterus (womb). The fluid inside the membrane is called amniotic fluid.

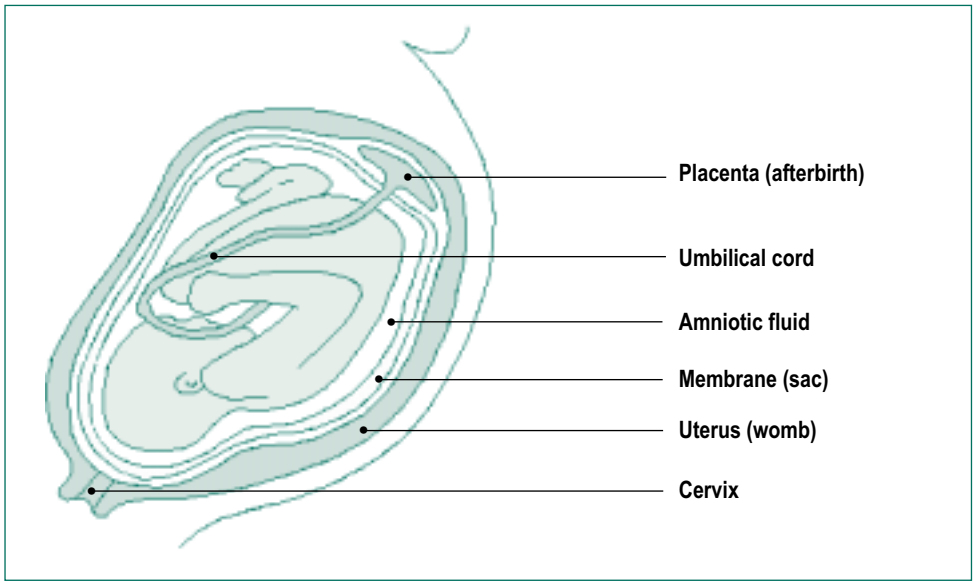
In preparation for labour the cervix softens and shortens. This is sometimes referred to as "ripening of the cervix".

Before or during labour the membranes rupture (break) releasing the fluid. This is often referred to as "your waters breaking".

During labour the cervix dilates (widens) and the uterus contracts to push your baby out.

In most pregnancies labour starts naturally between 37 and 42 weeks, leading to the birth of the baby.

Induction of labour is a process designed to start labour artificially.



When is induction recommended?

When it is felt that your or your baby's health is likely to benefit, the midwife or doctor may offer and recommend induction of labour. On average about one in five labours are induced.

There are a number of reasons why induction may be offered and recommended. For example if you have diabetes or pre-eclampsia (high blood pressure).

If you are healthy and have had a trouble free pregnancy, induction of labour may be offered if:

- your pregnancy is more than 41 weeks
- your waters break before labour starts

When induction of labour is being considered, your doctor or midwife should fully discuss your options with you before any decision is reached. This should include explaining the procedures and care that will be involved and whether there are any risks to you or your baby.

If you have had a previous caesarean section or have had more than five babies this may affect whether induction is recommended.

If your pregnancy is more than 41 weeks

Even if you have had a healthy trouble free pregnancy, you should be offered induction of labour after 41 weeks because from this stage the risk of your baby developing health problems increases. An induction because you are overdue does not increase the chance of you needing a caesarean section.

If you choose not to be induced at this stage then from 42 weeks you should be offered:

- Twice weekly checks of your baby's heartbeat using a piece of equipment called an electronic fetal heart rate monitor.
- A single ultrasound test to check the depth of amniotic fluid (or "waters") surrounding your baby.

An ultrasound scan in early pregnancy (before 20 weeks) can help to determine your baby's due date more accurately. This reduces your chances of unnecessary induction.

If your waters break before labour starts

Sometimes a woman's waters break before labour starts. This happens in about one in twenty pregnancies and is known as prelabour rupture of the membranes (or PROM). When this happens, about nine out of ten women will go into labour naturally within twenty-four hours. The longer the time between PROM and the birth of the baby the higher the risk of infection to you or your baby.

If you are more than 37 weeks pregnant and your waters have broken but you have not gone into labour you should be offered the choice of either:

- Induction of labour

OR

- A "wait and see approach" to see if labour will start naturally

As a wait and see approach carries a slight risk of infection, you will need to:

- check your temperature twice a day
- check for changes in the colour or odour of your amniotic fluid ("waters")
- check for any other signs of fever (e.g. shivers, flushing)

If you have not gone into labour after, at most, four days induction is strongly recommended.

If your waters break before you go into labour, your chances of having a caesarean section will not be increased by choosing either induction or "wait and see".

How is labour induced (started)?

There are a variety of methods that can be used to induce labour. You may be offered one or all of the methods described below depending on your individual circumstances.

Membrane sweeping

This has been shown to increase the chances of labour starting naturally within the next 48 hours and can reduce the need for other methods of induction of labour.

Membrane sweeping involves your midwife or doctor placing a finger just inside your cervix and making a circular, sweeping movement to separate the membranes from the cervix. It can be carried out at home, at an outpatient appointment or in hospital.

If you have agreed to induction of labour, you should be offered membrane sweeping before other methods are used. The procedure may cause some discomfort or bleeding, but will not cause any harm to your baby and it will not increase the chance of you or your baby getting an infection. Membrane sweeping is not recommended if your membranes have ruptured (waters broken).

Using prostaglandins

Prostaglandins are drugs that help to induce labour by encouraging the cervix to soften and shorten (ripen). This allows the cervix to open and contractions to start.

Prostaglandins are normally given as a tablet or gel that is inserted into the vagina. This is usually done in hospital on an ante-natal ward. More than one dose may be needed to induce labour. Doses should only be given every six to eight hours.

If your membranes have not yet ruptured (waters broken) prostaglandins are the recommended method of induction. This is the case whether this is your first pregnancy or not, and whether or not your cervix has ripened.

Before giving prostaglandins your midwife or doctor should check your baby's heart beat. After being given prostaglandins you should lie down for at least thirty minutes. Once your contractions start your midwife or doctor should monitor your baby's heartbeat using a "CTG" or electronic fetal heart rate monitor. Once it is established that everything is okay, the CTG should be discontinued and you will be able to move around. For further information see the National Institute for Clinical Excellence information booklet "Monitoring your baby's heartbeat during labour" – 2001.

There is no evidence to suggest that labour induced with prostaglandins is any more painful than labour that has started naturally. However prostaglandins sometimes cause vaginal soreness.

Very occasionally prostaglandins can cause the uterus to contract too much which may affect the pattern of your baby's heartbeat. If this happens you should be asked to lie on your left side. You may be given other medication to help relax the uterus and any prostaglandin tablet or gel remaining in your vagina may be removed.

Using Oxytocin

Oxytocin is given in hospital in the delivery room (labour ward).

This is a drug that encourages contractions. Oxytocin is given through a drip and enters the bloodstream through a tiny tube into a vein in the arm. Once contractions have begun, the rate of the drip can be adjusted so that your contractions occur regularly until your baby is born.

If your membranes have ruptured (waters broken) prostaglandins and oxytocin are shown to be equally effective methods of inducing labour. This is the case whether this is your first pregnancy or not, and whether or not your cervix has ripened.

Whilst being given the oxytocin the midwife or doctor should monitor your baby's heartbeat continuously. For further information see the National Institute for Clinical Excellence information booklet "Monitoring your baby's heartbeat during labour" – 2001.

If your waters have not broken, a procedure called an amniotomy may be recommended. This is when your midwife or doctor makes a hole in your membrane to release (break) the waters. This procedure is done through your vagina and cervix using a small instrument. This will cause no harm to your baby, but the vaginal examination needed to perform this procedure may cause you some discomfort.

Women who have oxytocin are more likely to have an epidural to help with pain. An epidural is a pain relief injection given into your back. Oxytocin is given by a drip and being attached to this will limit your ability to move around. Whilst it may be okay to stand up or sit down, it will not be possible to have a bath or move from room to room.

Very occasionally oxytocin can cause the uterus to contract too much which may affect the pattern of your baby's heartbeat. If this happens you should be asked to lie on your left hand side and the drip will be turned down or off to lessen the contractions. Sometimes another drug will be given to counteract the oxytocin and lessen the contractions.

If you have already had prostaglandins, oxytocin should not usually be given for at least six hours.

Your doctor or midwife should fully discuss these options with you before any decision is reached. They should explain the procedures and care that will be involved and whether there are any risks to you or your baby.

Further information

For further information about induction of labour, and all other aspects of pregnancy and childbirth, talk to your midwife or doctor.

Everyone has the right to be fully informed and to share in decision-making about health care. You can discuss this guideline with your midwife or doctor. If you have access to the internet and would like to find out more about childbirth, visit the NHS Direct website www.nhsdirect.nhs.uk or telephone NHS Direct on 08 45 46 47.

For further information about NICE, the Clinical Guidelines Programme or other versions of this guideline (including the sources of evidence) you can visit the NICE website at www.nice.org.uk. Copies of the NICE guideline can be requested from 0870 1555 455, quoting the reference number 24010.

For the full version of the Clinical Guideline including sources of evidence for the recommendations made in this booklet contact The Clinical Effectiveness Support Unit, The Royal College of Obstetricians and Gynaecologists (RCOG). Or you can visit the RCOG website at www.rcog.org.uk or e-mail iol@rcog.org.uk.

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Appendix D

Cervical scoring systems

1. Bishop score[1]

		Pelvic score			
		0	1	2	3
Cervical feature	Dilatation (cm)	0	1-2	3-4	5-6
	Effacement (%)	0-30	40-60	60-70	80+
	Station (cm)*	-3	-2	-1/0	+1/+2
	Consistency	Firm	Medium	Soft	-
	Position	Posterior	Mid-position	Anterior	-

2. Modified Bishop score (Calder score)[2]

		Pelvic score			
		0	1	2	3
Cervical feature	Dilatation (cm)	<1	1-2	2-4	>4
	Length of cervix (cm)	>4	2-4	1-2	<1
	Station (cm)*	-3	-2	-1/0	+1/+2
	Consistency	Firm	Average	Soft	-
	Position	Posterior	Mid; Anterior	-	-

* in both systems station is measured in cm relative to the ischial spines.

For the purpose of this guideline the modified Bishops score is used to assess the cervical condition.

1. Bishop EH. Pelvic scoring for elective induction. Obstet Gynecol, 2, 1964, 24, 266-268

2. Calder AA, Embrey MP, and Hillier K. Exta-amniotic prostaglandin E2 for the induction of labour at term. Journal of Obstetrics & Gynaecology of the British Commonwealth., 1, 1974, 81, 39-46.England

Appendix E

Abbreviations

bpm	Beats per minute
BP	Blood pressure
CTG	Cardiotocograph(y)
EFM	Electronic fetal monitoring
FBS	Fetal blood sampling
FHR	Fetal heart rate
FSE	Fetal scalp electrode
IA	Intermittent auscultation
RCT	Randomised controlled trial
VE	Vaginal examination

Labour

- Is the process of uterine contractions leading to progressive effacement and dilatation of the cervix and birth of the baby.

- The term is usually restricted to pregnancies at gestations greater than the legal definition of fetal viability (24 weeks in the UK).

Induction of Labour

- Induction of labour is an intervention designed to artificially initiate uterine contractions leading to progressive dilatation and effacement of the cervix and birth of the baby. This includes both women with intact membranes and women with spontaneous rupture of the membranes but who are not in labour.

- The term is usually restricted to pregnancies at gestations greater than the legal definition of fetal viability (24 weeks in the UK).

Cervical Ripening

- Cervical ripening is a component part of induction of labour employed when the cervix is unfavourable in order to facilitate dilatation when labour is established.

Augmentation

- Augmentation is an intervention designed to increase the rate of progress of labour.

Prolonged pregnancy

- For the purpose of this guideline prolonged pregnancy is defined as those pregnancies continuing past 287 days (41 weeks) from the first day of the last menstrual period.

Cervical favourability

- Within the systematic reviews focusing on induction of labour the definition of favourable/unfavourable cervix varied depending on the scoring system used (see Appendix D), however the cut-off between unfavourable and favourable within the trials was set between a Bishop's Score of 4-8.

- For the purposes of this guideline a favourable cervix is defined as one with a modified Bishops score of >86.

Uterine hypercontractility (with or without FHR changes)

- For the purpose of this guideline uterine hypercontractility without FHR changes included uterine tachysystole (>5 contractions per 10 minutes for at least 20 minutes) and uterine hypersystole/hypertonus (a contraction lasting at least two minutes)

- uterine hyperstimulation with FHR changes denoted uterine hyperstimulation syndrome (tachysystole or hypersystole with fetal heart rate changes such as persistent decelerations, tachycardia or decreased short term variability).

Suspicious and Pathological CTG

Grading system for FHR patterns as recommended in the NICE Guideline "The Use of Electronic Fetal Monitoring" published May 2001. This incorporates both the proposed definitions of FHR patterns and categorisation schemes.

Table 4 Categorisation of fetal heart rate traces

Category	Definition
Normal	A CTG where all four features fall into the reassuring category.
Suspicious	A CTG whose features fall into one of the non-reassuring categories and the remainder of the features are reassuring.
Pathological	A CTG whose features fall into two or more non-reassuring categories or one or more abnormal categories.

Table 5 Categorisation of fetal heart rate (FHR) features

Feature	Baseline (bpm)	Variability (bpm)	Decelerations	Accelerations
Reassuring	110–160	≥ 5	None	Present
Non-reassuring	100–109 161–180	< 5 for >40 to <90 minutes	Early deceleration Variable deceleration Single prolonged deceleration up to 3 minutes	*The absence of accelerations with an otherwise normal CTG are of uncertain significance*
Abnormal	<100 >180 Sinusoidal pattern ≥ 10 minutes	<5 for ≥ 90 minutes	Atypical variable decelerations Late decelerations Single prolonged Single prolonged deceleration >3 minutes	