National Guidelines to Support Vaginal Births and Reduce Primary Cesarean Section Deliveries 2020

These national guidelines were developed by the multi-sectoral Oversight Committee for the Program to Reduce Unnecessary Cesarean Section Deliveries in Jordan, in collaboration with USAID Health Service Delivery, and made possible by the generous support of the American people through the United States Agency for International Development (USAID). The contents are the responsibility of USAID Health Service Delivery and do not necessarily reflect the views of USAID or the United States Government.

FOREWORD

Over the past decade, Jordan achieved substantial progress in improving maternal health. This was culminated by the launch of Jordan's Maternal Mortality Surveillance and Response (JMMSR) system in 2018 and its subsequent National Maternal Mortality Report. This was a big achievement for Jordan, considering the comprehensive nature of data collected through the JMMSR system which addresses most of the issues related to maternal mortality measurement within the National Strategy for the Health Sector (2015-2019). Thus, Jordan is on the right path towards contributing to health targets for Sustainable Development Goal 3.

However, surveillance is information for action. It is not sufficient to merely be able to calculate an accurate maternal mortality ratio for Jordan. The implementation of the JMMSR system taught us that, although every mother's death had a sad story behind it, the healthcare delivery system had a lot to learn to avoid similar cases in the future.

The success of our journey towards improving maternal health in Jordan lies in translating the responses from the National Maternal Mortality Report into actions that are implemented and monitored nationwide. One of these important responses is the development of evidence-based National Guidelines to Support Vaginal Births and Reduce Unnecessary Primary Cesarean Section Deliveries. These guidelines are considered a highly relevant reference source for healthcare providers to ensure consistent quality of care experienced by pregnant women. When used conscientiously, they will improve maternal outcomes and enable pregnant women to make informed decisions that will eventually reduce the existing rate of primary cesarean section deliveries in Jordan and contribute to eliminating preventable maternal deaths.

I would like to extend our deepest gratitude to the Oversight Committee members from the Ministry of Health, the Royal Medical Services, university hospitals, and the private health sector for their expertise and unwavering commitment in developing these, first of their kind, National Guidelines to Support Vaginal Births and Reduce Primary Cesarean Section Deliveries.

I would also like to convey a special note of appreciation to the United States Agency for International Development (USAID) for their generous support to the Government of Jordan over the years.

Last but not least, I dedicate a special acknowledgement to the USAID Health Service Delivery team for their diligent efforts in collaborating with the Oversight Committee to develop these guidelines.

So, let us make the most of the lessons learned and take the necessary actions towards accomplishing our ultimate goal together.

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ACRONYMS

ARM	Artificial Rupture of the Membranes
CCRB	Cook's Cervical Ripening Balloon
CS	Cesarean Section
CTG	Cardiotocography
CPD	Cephalopelvic Disproportion
ECV	External Cephalic Version
EFM	Electronic Fetal Monitoring
FHR	Fetal Heart Rate
HIV	Human Immunodeficiency Virus
HSV	Herpes Simplex Virus
LSCS	Lower Segment Cesarean Section
NICE	The National Institute for Health and Care Excellence
PGE2	Prostaglandin E2
VBAC	Vaginal Birth after Cesarean
VE	Vaginal Examination
WHO	World Health Organization

GLOSSARY

Amniotomy	Artificial rupture of membranes.
Augmentation	Stimulating the uterus during labour to increase the frequency, duration and strength of contractions.
Bishop score	A group of measurements made by doing a vaginal examination, used to determine the favourability of the cervix based on the station, dilation, effacement (or length), position and consistency of the cervix.
Breech presentation	The initial presentation of the fetus buttocks, foot or feet ('footling breech') in the birth canal instead of its head.
Cook Cervical Ripening (double) balloon	A double catheter device that is inserted through a small and potentially closed cervical os.
Cardiotocography	A technical method to monitor Fetal Heart Rate (FHR) pattern in relation to the pattern and intensity of uterine contractions. The FHR can be monitored non-invasively using a sensor attached to the woman's abdomen, or invasively using an electrode attached to the presenting part of the fetus (usually the fetal scalp). The uterine contractions are recorded using an external sensor held in place on the woman's abdomen. Changes in FHR that suggest fetal compromise may prompt the need for an instrumental or operative birth of the baby. Also referred to as Electronic Fetal Monitoring (EFM).
Cervical ripening	Softening of the cervix prior to the onset of labor contractions. This allows its shape to change from being long and closed, to being thinned out (effaced) and starting to open (dilate). It occurs either naturally or because of physical or pharmacological interventions.
Induction	The process of starting labor medically.
Membrane sweep	A procedure where the examining finger passes through 'sweep' through the cervix to rotate against the wall of the uterus during an internal examination. The aim is to separate the chorionic membranes from the decidua, leading to a release of prostaglandins and subsequent onset of labor.
Stimulation	The process of inducing contractions when Rupture Of Membranes (ROM) has occurred pre-labor.

Pre-labor rupture of membranes	Rupture of the amniotic membranes before the onset of labor.

INTRODUCTION

Cesarean Section (CS) is a major surgical procedure that can save the lives of both the fetus and the mother. However, a medically unnecessary CS is associated with a higher risk of perinatal and maternal mortality compared to a vaginal delivery[1]. Therefore, it is important for healthcare providers to maintain the critical skills necessary to support vaginal birth; as well as, the safe and appropriate practices to prevent overuse of CS delivery, particularly primary CS delivery. The Jordan Population and Family Health Survey for the year 2017-2018 reported a CS rate of 26 percent in 2018[2]. One of the main findings of the first National Maternal Mortality Report[3] for Jordan was that more than half of the maternal deaths for 2018 (62.9%) delivered by a CS. The proportionately high number of maternal deaths in women who delivered by CS indicates that further evaluation of the circumstances around CS delivery is pertinent. The findings underscore the need to reduce unnecessary primary (performed for the first time) CS delivery, and improve pre-operative and intra-operative procedures and post-operative monitoring for CS deliveries. Given the rising trend of CS delivery in Jordan, [4][5][6] now is the time to address this issue.

In line with the responses raised by the National Advisory Group of Jordan's Maternal Mortality Surveillance and Response (JMMSR) system, along with recommendations of the current evidence on CS rate in Jordan, USAID Health Service Delivery established a multi-sectoral CS Oversight Committee of leading obstetrics and gynecology professors and specialists from the Ministry of Health (MOH), Royal Medical Services (RMS), university hospitals, and the private sector. The CS Oversight Committee activated a quality improvement program for reducing unnecessary CS deliveries in Jordan by developing the Primary CS Reduction Action Plan and Roadmap.

According to the World Health Organization (WHO), the recommended CS delivery rate should not exceed 15 percent in any country due to the associated health risks[7]. USAID Health Service Delivery will collaborate with the CS Oversight Committee to implement the quality improvement program focusing on reduction of primary CS as the main driver to reduce subsequent CS deliveries in selected private and public hospitals. In collaboration with the CS Oversight Committee, USAID Health Service Delivery developed these national guidelines based on the latest evidence-based practices targeting healthcare providers working in labor and delivery units.

[1]Lumbiganon P, Laopaiboon M, Gülmezoglu AM, Souza JP, Taneepanichskul S, Ruyan P, et al. Method of delivery and pregnancy outcomes in Asia: the WHO global survey on maternal and perinatal health 2007-08. Lancet [Internet]. 2010;375(9713):490–9. Available from: http://dx.doi.org/10.1016/S0140-6736(09)61870-5.

[2]Department of Statistics Amman, The DHS Program - ICF. Jordan Population and Family Health Survey 2017-18. 2019;1–345. Available from: https://www1.wfp.org/publications/wfp-jordan-comprehensive-food-security-and-vulnerability-assessment-2018.

[3]Ministry of Health. The National Maternal Mortality Report 2018.

[4]Al Rifai R. Rising cesarean deliveries among apparently low-risk mothers at university teaching hospitals in Jordan: Analysis of population survey data, 2002-2012. Glob Heal Sci Pract. 2014;2(2):195–209.

[5]AM B, SA AD, YS K, A B, F S, TZ A, et al. Cesarean Section: Incidence, Causes, Associated Factors and Outcomes: A National Prospective Study from Jordan. Gynecol Obstet Case Rep. 2017;03(03):1–11..

[6] Abdel-Fattah Salem. Caesarean section trends in Jordan: A cross sectional study of 2.5 million births over 33 years. 2019;2026:1–19.

[7] World Health Organization. (2018). WHO recommendations non-clinical interventions to reduce unnecessary caesarean sections. World Health Organization.

AIM OF THE GUIDELINES

These evidence-based national guidelines aim to standardize the practice of healthcare providers working in labor and delivery units, therefore, ensuring consistent quality of care experienced by pregnant women during delivery and eventually achieving the ultimate goal of safe reduction in the existing unacceptably high rate of primary CS in Jordan.

These guidelines provide clinicians with evidence-based strategies and practice on effective management and monitoring of first and second stages of labor, also presents strategies on active management of labor, induction and augmentation of labor, and guidance on selected indications for planned CS. These guidelines also equip health care providers with evidence-based counseling messages on normal delivery and CS given to women during antenatal visits.

These guidelines do not attempt to define acceptable primary CS rates. The main purpose is to standardize the quality practice for effective management of labor and to enable women to make informed decisions, consequently safely avoiding unnecessary primary CS

METHODOLOGY

These guidelines were developed through extensive literature review and search. The aim of the literature review was to identify and synthesize relevant evidences within the published literature, in order to answer specific clinical questions.

In addition to the literature, several useful clinical guidelines for the safe prevention of primary CS and consistent quality care have been reviewed. These include:

- The Obstetric Care Consensus on the safe prevention of CS from the American College of Obstetricians and Gynecologists
- Preventing the First Cesarean Delivery: Summary of a Joint Eunice Kennedy Shriver National Institute of Child Health and Human Development, Society for Maternal-Fetal Medicine, and American College of Obstetricians and Gynecologists Workshop
- The CS National Evidence-based Clinical Guideline 132 from the Royal College of Obstetricians and Gynecologists.
- "Toolkit to Support Vaginal Birth and Reduce Primary Cesareans", from the California Health Care Foundation.
- NICE (2014) Intrapartum care for healthy women and babies. Clinical Guideline (CG190) London: NICE Available at: https://www.nice.org.uk/guidance/cg190.

First Guideline: Effective Management of Labor and Delivery to Reduce Primary Cesarean Section

Management of Spontaneous Labor and Labor Dystocia

In this section, the guideline outlines evidence-based recommendations for the management and monitoring of the progress of spontaneous labor. A suggested protocol for management of labor is also included. The section begins with definitions then goes on to explain the management of the first stage of labor.

First Stage of Labor

1. Latent first stage of labor

- Period of time, not necessarily continuous, when there are **painful contractions** and there is some **cervical change**, including cervical effacement and dilatation up to 4 cm.
- This phase can **last** from 6-10 hours up to 2-3 days. During the latent phase, women should be encouraged to stay at home.

While **women who are at home**, they should be encouraged to:

- Perform normal activities.
- Go for a walk.
- Take a warm shower/bath.
- Place hot water bottle filled with hot (but not boiling) water to warm the back, and groin. Take care to wrap the bottle in a towel or soft cover before using it.
- Have a back massage.
- Try to sleep/rest/nap.
- Keep well hydrated.
- Monitor fetal movements.
- Take analgesia like paracetamol.

A **latent phase leaflet** should be available to all antenatal women, if appropriate.

2. Established first stage of labor

- A period of time when there are **regular painful contractions** and **progressive cervical dilatation** starting from 4 cm.
- The active phase may not start until a **dilatation of 6 cm** and slow progress before then may not be intrinsically harmful.
- **First labor lasts**, on average, 8 hours and is unlikely to exceed 18 hours.
- **Second and subsequent labors last**, on average, 5 hours and are unlikely to exceed 12 hours. Meanwhile, the length of labor will vary between individuals.

Progress is considered normal when:

- The cervix dilates by two or more centimeters in 4 hours.
- The head rotates and descends.
- The contractions remain frequent, strong and the duration of each contraction lengthens.

Management of the First Stage of Labor

- Discourage women from **staying supine** during the first stage of labor.
- **Do not offer or advise clinical intervention** if labor is progressing normally and the woman and baby are well.
- In normally progressing labor, **do not routinely perform an amniotomy.**
- **Do not routinely** combine an early amniotomy with the use of oxytocin

Partogram Use

Use a partogram with a 4-hour action line once labor is underway, and record the following observations in the Labor Care Record and/or partogram *(for more details, see annex 3):*

- Hourly pulse.
- 4-hourly temperature, respiratory rates and blood pressure.
- Frequency of passing urine - the bladder should be emptied once every 4 hours or via intermittent catheterization if the woman is unable to void. A urine analysis should be performed.
- Vaginal examination (VE) 4-hourly or more frequently if there is concern about progress.
- Half-hourly documentation of the length, strength and frequency of contractions.
- Fetal Heart Rate (FHR) should be assessed every 15 minutes. In addition, the FHR should be monitored immediately following a contraction for at least 1 minute.

Delay in the First Stage of Labor

If a prolonged latent phase is suspected, the case should be discussed with a senior obstetrician. In some cases, particularly if the gestation is post mature, it may be appropriate to induce labor.

If delay in the established first stage of labor is suspected, an amniotomy should be considered for all women with intact membranes after assessing all aspects of progress of labor when diagnosing delay, including:

- **Cervical dilatation** of less than 2 cm in 4 hours for first labors.
- Cervical dilatation of less than 2 cm in 4 hours or, a slowing in the progress of labor for second or subsequent labors.
- Descent and rotation of the **baby's head**.
- **Station** of the fetal head.
- Changes in the strength, duration and frequency of **uterine contractions**.
- Urinalysis.

All women with suspected **delay in the established** first stage of labor should have a **VE** two hours later. If dilatation is less than 1 cm, a diagnosis of delay in the progress of labor should be made.

For a multiparous woman with confirmed delay in the established first stage of labor, an obstetrician should perform a full assessment, including abdominal palpation and VE, before making a decision about using oxytocin.

Oxytocin Use

- Ensure that the time between **increments of the dose** is no more frequent than every 30 minutes. Increase the rate of giving oxytocin until there are four-five contractions in 10 minutes.
- Continuous **EFM** should be used.
- A **VE** four hours after starting oxytocin should be done in established labor:
  - If cervical dilatation has increased by less than two centimeters after four hours **of oxytocin, further review is required to assess the need for CS.**
  - If cervical dilatation has increased by two centimeters or more, advise four-hourly VEs.

SECOND STAGE OF LABOR

1. Passive second stage of labor

Passive phase starts when there is **full dilatation** of the cervix before, or in the absence of involuntary expulsive contractions.

2. Active second stage of labor

Active phase starts when:

- The **baby is visible**.
- There are **expulsive contractions** with full dilatation of the cervix or other signs of full dilatation of the cervix.
- There is an active **maternal effort** following confirmation of full dilatation of the cervix in the absence of expulsive contractions.

Management of Second Stage of Labor

Table 1: Duration of the second stage and definitions of delay

	Nulliparous Woman	Multiparous Woman
Expected time of birth	Birth would be expected to take place within 3 hours of the start of the active second stage in most women.	Birth would be expected to take place within 2 hours of the start of the active second stage in most women.
Delay	Suspect delay if progress (in terms of rotation and/or descent of the presenting part) is inadequate after 1 hour of active second stage.	Suspect delay if progress (in terms of rotation and/or descent of the presenting part) is inadequate after 30 minutes of active second stage.
VE	Offer VE and then offer an amniotomy if the membranes are intact.	Offer a VE and then offer an amniotomy if the membranes are intact.
Diagnosis of delay	**Active second stage lasts two hours.**	**Active second stage lasts one hour.**

If **full dilatation** of the cervix has been confirmed in a woman **without regional analgesia**, but she does not get an urge to push, carry out further assessment after 1 hour.

Oxytocin Use

The use of oxytocin for nulliparous women should be considered if contractions are inadequate at the onset of the second stage.

Delay in the Second Stage

An obstetrician should assess a woman with confirmed delay in the second stage before considering the use of oxytocin. After initial obstetric assessment of a woman with delay in the second stage, an ongoing obstetric review should be maintained every 15–30minutes.

Table 2: Permissible time limits in normal labor-based on cervical dilatation of 2cm in 4 hours

Stage of labor	Nulliparous	Multiparous
First stage of labor	12 hours	12 hours
Second stage – passive	1 hour	1 hour
Additional allowance for an epidural	1 hour	1 hour
Second stage- active	1 hour – If no progress with rotation and/or descent – offer a VE and Artificial Rupture of the Membranes (ARM) if membranes are intact. Allow another 1 hour - diagnose delay when it has lasted two hours and refer to an obstetrician. Total – 3 hours (from start of active second stage to birth).	30 mins – If no progress with rotation and/or descent – offer a VE and ARM if membranes are intact. Allow another 30 mins - diagnose delay when it has lasted one hour and refer to an obstetrician. Total – 2 hours (from start of active second stage to birth)
Third stage - physiological	1 hour	1 hour
Third stage- active	30 mins	30mins

ACTIVE MANAGEMENT OF LABOR

This protocol is not recommended for routine management of women admitted in spontaneous labor. However, it can be used in special circumstances and within busy delivery units where there is a need for rapid turnover.

Eligibility criteria for Active Management

- Term uncomplicated pregnancy
- Singleton fetus in a cephalic presentation
- Spontaneous onset of labor.

Labor protocol for the active-management group

1. **One-to-one nursing care if possible.**
2. **Standardized criteria for the diagnosis of labor:**

   An obstetrician should diagnose true labor based on the following criteria:

   - Painful regular contractions accompanied by effacement of at least 80 percent, bloody show (not precipitated by VE), or spontaneous rupture of the membranes.
   - The cervix should be 3-4 cm dilated.

Nullipara	• A diagnosis of the active phase of labor should not be made in **nullipara** without regular uterine contractions plus complete cervical effacement with at least three cms dilatation
Multipara	• The active phase may be entered and the cervix may be three to four cms dilated before cervical effacement is complete

Failure to progress is diagnosed if:

During the first stage of labor:

- IF cervical dilatation is less than 1 cm per hour) despite effective uterine contractions on two consecutive VE (total 4 hours)
- 4 hours on maximum dose of oxytocin and failure to achieve effective contractions.

During the second stage of labor

- Maximum 3 hours in primigravida
- Maximum 2 hours in multiparous

3. Management of labor

- Record the following observations in the Labor Care Record and/or partogram:
    - Hourly pulse
    - Temperature, respirations and blood pressure should be monitored once every 4 hours.
    - Frequency of passing urine - the bladder should be emptied once every 4 hours or via intermittent catheterization if woman is unable to void and a urinalysis performed
    - Half –hourly documentation of the length, strength and frequency of contractions.
- **Amniotomy (ARM)** is performed within 1-2 hours of the diagnosis of labor (or as soon as clinically feasible) if the membranes were still intact.
- **VE is** performed at least every two hours to ensure prompt detection of inefficient uterine action or failure to progress
- **FHR should be monitored by continuous CTG**
- **Oxytocin augmentation** can be started
    - Immediately following ARM in primigravida, **or**
    - 1-2 hours after ARM in multiparous if there are no effective uterine contractions or if the rate of cervical dilatation is less than 1 cm per hour
    - The oxytocin infusion is begun at a dose of 2 mU per minute and increased by 2mU per minute every 15 minutes until:
        - The maximal dose of 32 mU per minute is reached or
        - Effective uterine contractions are achieved (5 contractions in 10 minutes)
        - No hyperstimulation or a non-reassuring fetal-heart pattern is noted
- **Hyperstimulation** is defined as more than seven contractions of at least 30 seconds' duration during a 15-minute period or a single contraction lasting more than 60 seconds.
- If the **hyperstimulation** persists or a non-reassuring fetal-heart pattern occurs, oxytocin should be stopped, and resuscitative measures should be applied. If the situation improves, oxytocin can be started again at half the previous dose.

FETAL MONITORING ON ADMISSION FOR LABOR

- Offer intermittent auscultation of the FHR on admission to low-risk women in suspected or established labor as part of the initial assessment. (Do not offer cardiotocography (CTG)).
- Auscultate the FHR at first contact with the woman in suspected or established labor, and at each further assessment.
- Auscultate the FHR for a minimum of 1 minute immediately after a contraction and record it as a single rate.
- Palpate the maternal pulse to differentiate between maternal heart rate and FHR.
- Record accelerations and decelerations if heard.
- Perform CTG if intermittent auscultation indicates possible FHR abnormalities. Return to intermittent auscultation after 20 minutes if the trace indicates a low risk of fetal acidosis.
- If there is a rising baseline FHR or decelerations are suspected on intermittent auscultation:
    - Assess the complete clinical picture, including the woman's position and hydration, the strength and frequency of contractions, and maternal observations.
    - Change the plan **from intermittent auscultation to CTG.**
- If a fetal death is suspected, despite the presence of an apparently recorded FHR, offer real-time ultrasound assessment to check fetal viability.

Monitoring in Established Labor

First stage of labor	• The FHR should be auscultated as a minimum every 15 minutes for a minimum of one minute after a contraction.
Second stage of labor	• The FHR rate should be auscultated after every contraction, or at least every five minutes.

Monitor Hourly maternal pulse on the partogram to differentiate between fetal heart and maternal pulse.

Do not offer continuous CTG to women who have non-significant meconium if there are no other risk factors, see Annex (1) for more details of these risk factors.

Do not regard amniotomy alone for suspected delay in the established first stage of labor as an indication to start continuous CTG.

SECOND GUIDELINE: INDUCTION OF LABOR

Induction of labor is an intervention to artificially initiate uterine contractions leading to progressive dilatation and effacement of the cervix and birth of the baby.

- Women should be informed that most women enter into labor spontaneously by 42 weeks.
- At the 38th week antenatal visit, all women should be offered information about the risks associated with pregnancies that last longer than 42 weeks and their options.
- Induction of labor is commenced with one of the following:
  - ARM.
  - Prostaglandin E2 (PGE2) (Prostin®), also known as Dinoprostone.
  - PGE2 Vaginal Delivery System (Propess®)
  - Mechanical methods (Cook's Cervical Ripening Balloon (CCRB) or Foley's catheter).

INDUCTION PROCESSES AND PROCEDURES

Induction Processes

- At the 38-40 weeks' antenatal visit, women should be offered information about the risks of pregnancies lasting longer than 42 weeks of gestation.
- An induction of labor diary should be kept and maintained.
- Women asked to consider induction of labor should be given personalized verbal and/or written information about the benefits and risks for them and their babies and the alternatives to induction.

An information leaflet on induction of labor is recommended if appropriate.

Women being offered induction of labor should be counselled regarding:

- The indications for induction of labor.
- When, where and how induction is to be carried out.
- Arrangements for support and options available for pain relief.
- Options if the woman declines induction of labor.
- Risks and benefits associated with induction of labor.
- That induction of labor may be more painful than spontaneous labor, and epidural and assisted delivery are more likely to be required.
- That the induction may not be successful and what her options would be.
- Realistic timeline overview of the induction of labor process.

Process for Dealing with Maternal Request for Induction of Labor

- Induction of labor should not be routinely offered on maternal request alone. However, under exceptional circumstances, induction may be considered at or after 40 weeks.

- The decision to offer induction of labor for maternal request must be documented as such in the labor diary.

- Following a maternal request to induce, a cervical assessment should always be performed and documented. If the cervix is un-favorable (Modified Bishop's score <4) induction should be avoided/counselled against.

Individual Management Plan When Induction of Labor is Declined by the Pregnant Woman

- Respect the woman's decisions and discuss further care with her.

- When a woman declines induction of labor, the risks of not being induced should be discussed.

- An individual management plan should be developed and documented in the maternal records to at least include:

    - EFM on alternate days after 42 weeks' gestation.

    - Twice weekly ultrasound scans to assess liquor volume.

PRE-INDUCTION OF LABOR ASSESSMENT

Antenatal management	• It is considered best practice for an ultrasound to confirm gestation **before 20 weeks** gestation, preferably at 10-13 weeks. • This reduces the possibility of an inaccurate post mature diagnosis.
Cervical assessment	• All women should have their Modified **Bishop's Score assessed** and documented, prior to being booked for induction of labor unless membranes are ruptured.
Modified Bishop's Score	Women with a Modified Bishop's Score of <7 should be given vaginal PGE2 or balloon catheter. Women with a Modified Bishop's Score of ≥7 should have an ARM.
Membrane sweep	This is a simple procedure and is done during **VE**. Membrane sweep can be undertaken at the **40 weeks** antenatal visit for nulliparous women. All women should be offered sweeping of the membranes at a 41 weeks antenatal visit. **Post 41 weeks** of pregnancy, offer individual membrane sweeps if labor does not start spontaneously. A membrane sweep is not associated with increased maternal or neonatal infection. A membrane sweep is not associated with an increased risk of operative delivery.

Table (3): Modified Bishop's score

Score	0	1	2	3
Cervical dilatation (cms)	0	1-2	2-4	>4
Length (cms)	>4	2-4	1-2	<1
Consistency	Firm	Medium	Soft	
Position of the cervix	Posterior	Mid-anterior	Anterior	
Level of presenting part in relation to ischial spines	-3	-2	-1 / 0	+1 / +2

INDUCTION OF LABOR IN SPECIFIC CIRCUMSTANCES

1. Prolonged Uncomplicated Pregnancy

- Women should be given every opportunity to go into labor spontaneously.
- Women with low risk pregnancies should be offered an initial membrane sweep at 40-41 weeks of gestation.
- Offer additional membrane sweep if labor does not start spontaneously.
- Offer induction between 41+5 and 42+0 weeks, depending on the woman's preference and local circumstances.

2. Preterm Pre-Labor Rupture of Membranes

- If a woman has preterm pre-labor rupture of membranes, induction of labor should not be carried out before 34 weeks, unless there are additional obstetric indications (for example, infection or fetal compromise).
- After 34 weeks, induction of labor should be carried out only after discussion with an obstetrician.
- The following factors should be discussed with the woman before a decision is made to induce labor with vaginal PGE2:
    - Risks to the woman (for example: sepsis, possible need for CS).
    - Risks to the baby (for example: sepsis, problems relating to preterm birth).

- Availability of neonatal intensive care facilities.
- The option to wait until 37 weeks of gestation if no further complications.

3. Pre-Labor Rupture of Membranes at Term (at or over 37 week's gestation)

- Women with pre-labor rupture of membranes at term (at or over 37 weeks) should be offered a choice of induction of labor with vaginal PGE2 or expectant management.
- If the decision is expectant management, induction of labor is appropriate approximately 24 hours after pre-labor rupture of the membranes at term.
- Induction of labor can be commenced with either a PGE2 pessary or a PGE2 Delivery System. (Refer to Annex 2 for PGE2 Delivery System induction of labor).
- Stimulation of labor can be commenced with the oxytocin infusion if the cervical findings are favorable (Modified Bishop Score ≥ 7).

4. Previous CS

- The decision to induce labor following a previous CS must be made by an obstetrician after detailed discussion with the patient.
- Women who have had a previous Lower Segment Caesarean Section (LSCS) may be offered induction of labor with vaginal PGE2 or a mechanical method on an individual basis, taking into account the woman's circumstances and wishes.
- Induction of labor should not be undertaken where a woman has had a previous classical uterine CS or where there is any doubt about the integrity of the previous uterine scar.
- Women should be informed of the following risks with induction of labor:
  - Increased risk of need for emergency CS during induced labor.
  - Increased risk of uterine rupture.

5. Multiple Pregnancy

- Labor is induced in the same way as for singletons provided twin one is cephalic and there are no other risk factors present.
- Women with uncomplicated dichorionic twins are offered delivery at 37-38 weeks gestation.

6. Breech Presentation

- Induction of labor is not routinely recommended if a woman's baby is in a breech presentation.

7. Fetal Growth Restriction

- If there is severe fetal growth restriction with confirmed fetal compromise, induction of labor is not recommended.

- Where intrauterine growth restriction has been identified, any decision to induce labor must be made by an obstetrician, based on assessment of risk and the likelihood of success following an assessment of a Bishop's score.

8. History of Precipitous Labor

- If a woman has a history of precipitous labor, induction of labor to avoid a birth unattended by healthcare professionals should not be routinely offered.

9. Suspected Fetal Macrosomia

- In the absence of any other indications, induction of labor should not be carried out simply because a healthcare professional suspects a baby is large for date.

10. Maternal Diabetes

- Pregnant women with diabetes who have a normally grown fetus should be offered birth through elective induction of labor, or by elective CS, if indicated, after 38 completed weeks.

- An obstetrician should make a decision regarding the appropriate mode of birth

- Pregnant women with diabetes who have an ultrasound-diagnosed macrosomic fetus should be informed of the risks and benefits of vaginal birth, induction of labor, and CS.

11. Advanced Maternal Age

- The risk of fetal intrauterine death almost doubles where maternal age is between 40 and 44 years compared to younger women. It is therefore reasonable practice to offer these women earlier induction of labor.

- After discussion with the woman, induction of labor will be recommended at or after 40 years of age around 40 week's gestation.

- Earlier delivery (not to exceed 40 weeks) is recommended if maternal age is more than 44 years old.

12. Maternal Obesity

- Higher maternal body mass index at booking is associated with an increased risk of prolonged pregnancy and increased rate of induction of labor. Vaginal delivery and labor complications in obese women with prolonged pregnancies appear largely comparable to those of normal weight women with prolonged pregnancies. Induction of labor for prolonged pregnancy in obese women is a reasonable and safe management option but is an obstetrician's decision.

METHODS OF INDUCTION OF LABOR

Table (4): Methods of Induction of Labor

Methods of induction of labor	Recommendations
Pharmacological	• Vaginal PGE2 (PGE2 pessary or PGE2 Vaginal Delivery System) is the preferred method of induction of labor where a woman has intact membranes, unless there are specific clinical reasons for not using it (in particular the risk of uterine hyperstimulation). • Primigravida - One cycle of vaginal PGE2 controlled-release pessary 10mg, PGE2 Vaginal Delivery System: one dose over 24 hours. • Primigravida or multiparous women - One cycle of vaginal PGE2 3mg tablets: one dose, followed by a second dose after 6 hours if labor is not established (up to a maximum of two doses).
Mechanical Procedures	• Ensure the woman has been informed of the risks and benefits of achieving a vaginal birth and agrees to have a Vaginal Birth After CS (VBAC). • Decide a suitable date for initiating labor (routine will be term +12 days). Consider earlier induction if medical concerns are present. • Suitably trained clinicians will insert the Foley's catheter in a delivery suite. If the fetal head is 4/5 palpable, or more, then cervical ripening can be considered. • Perform standard length pre-insertion (30 min) CTG and post insertion (60 min) CTG, perform observations and history as per usual induction protocol. • The balloons should be deflated and the catheter should be removed. • Amniotomy should be performed. The device has reported high success at achieving a favourable cervix for amniotomy. • The woman has a 30 minutes post amniotomy CTG and either sits up or mobilizes for up to 2 hours.

Methods of induction of labor	Recommendations
	• If no significant uterine activity results, oxytocin induction should commence under continuous EFM (refer to Table7. NICE guidelines (2017) for CTG interpretation and classification). • It is the obstetrician decision for how long to continue oxytocin induction but usually no longer than 6 hours in absence of any uterine activity.
Surgical (Amniotomy)	• Amniotomy / ARM alone or with oxytocin, should not be used as a primary method of induction of labor unless there are specific clinical reasons for not using vaginal PGE2. • ARM is ideally offered for women who have a completely effaced cervix and at least 2-3 centimetres dilated or Cervical assessment (Modified Bishops score ≥ 7) • Perform an abdominal palpation to confirm presentation and engagement. • FHR must be auscultated and recorded before and after ARM. If assessed as high risk, a CTG should be performed. • Perform a VE and rupture the membranes using an amnihook. • If the presenting part is high, the decision to perform ARM needs to be reviewed (discuss with the obstetrician or senior member of obstetric team). • Record observations of the liquor (clear, blood stained, meconium, no liquor). • If labor is not established 2 hours after ARM, an oxytocin infusion should be started. • Oxytocin infusion can be commenced in primigravida women immediately after an ARM.

1. Pharmacological

General principles of PGE2 administration

- Antenatal assessment and CTG prior to proposed PGE2 administration. The CTG can be discontinued after 30 minutes.
- Assess Modified Bishop Score:
  - Cervical score of <7 insert PGE2 (vaginal PGE2 and PGE2 Vaginal Delivery System) Cervical score of ≥7 or more, transfer to labor ward for ARM.
- CTG for 60 minutes following insertion of PGE2.

Vaginal PGE2

- Vaiginal PGE2 should only be used for those with an unfavorable cervix (Modified Bishops Score < 7).
- A 3mg PGE2 vaginal pessary is administered Q 6 hours (maximum total dose - 6mg/24 hours for all women).
- Reassess Modified Bishop Score 6 hours after each PGE2 vaginal pessary
- Oxytocin ***must NOT be started*** for 6 hours following administration of vaginal PGE2.

Vaginal PGE2 pessary regime

1st PGE2	Pessary (vaginal tablet) 3mg
2nd PGE2 6 hours after	Pessary (vaginal tablet) 3mg
6 hours following 2nd PGE2	Review by obstetrician for decision regarding further management

PGE2 Vaginal Delivery System introduction

PGE2 Vaginal Delivery System is presented as a thin, flat semi-opaque polymeric vaginal delivery system, which is rectangular with a tape attached. Each PGE2 Vaginal Delivery Systemvaginal device contains 10mg of dinoprostone within in a hydrogel delivery system that releases approximately 0.3mg/hr over 24hours. In studies, it has been shown to be as effective as existing methods of induction, with similar side effect profile, but there is also evidence that less syntocinon may be required.

For more detailed of instructions for implementing PGE2 Vaginal Delivery System *see Annex 2*.

2. Surgical (Amniotomy)

- Amniotomy is the deliberate ARM, used for induction of labor. The procedure is only possible if the membranes are physically accessible.

- Amniotomy alone should not be used as a primary method of induction of labor unless there are specific clinical reasons for not using vaginal PGE2, in particular the risk of uterine hyperstimulation.

3. Mechanical Procedures

- Mechanical methods used for induction of labor include various types of balloon catheters introduced into the cervical canal or into the extra-amniotic space.

- Any decisions made to use mechanical methods (e.g. Foley's catheter, CCRB catheters) should be made by the obstetrician managing the woman's care, and a clear plan must be documented and included in the maternity records.

- **Foley's catheter** stays in for 24 hours. It may expel naturally, indicating that amniotomy is possible. It is **a single use device**.

Use of a double-balloon catheter for cervical ripening

The CCRB is a double catheter device that can be inserted through a small and potentially closed cervical os. The uterine balloon is inflated with 50 - 80 mL of sterile saline and pulled back. A second vaginal balloon is then inflated with the same quantity of fluid. The device aims to ripen the cervix over a 12-18-hour time-period. After this time, or when the catheter falls out, it is usually possible to perform an amniotomy and initiate induction with oxytocin infusion as per standard protocol.

The CCRB is unlicensed for use in women have a history of previous CS; however, the evidence of its efficacy during this process worldwide is encouraging. Importantly, it does not involve PGE2 drugs, and is not linked to hyperstimulation. Thus, it avoids the need for continuous electronic monitoring during use.

- The double balloon should be used where mechanical cervical ripening prior to induction of labor is required, i.e. in the setting of failed pharmacological methods using PGE2 or in the context of induction of labor in a woman who has previously had one CS delivery.

- Use of the balloon should be undertaken only after appropriate training by the manufacturer or a suitable obstetric colleague.

Potential benefits

- Remains in situ for 24 hours.
- Introducer to facilitate ease of insertion.
- Licensed for use in pregnancy for cervical ripening and has a better outcome of cervical ripening in nulliparous women.

Contraindications

- Any contraindication for a vaginal birth.

Warning

If the woman becomes very **uncomfortable** after inflation of both balloons, it may be secondary to the **vaginal balloon** and it can be deflated to 60 mL (instead of 80 mL).

***For more detailed of instructions for using* a double-balloon catheter for cervical ripening**, *see Annex 2*.

INDUCTION OF LABOR – GENERAL PRINCIPLES

- Women suitable for ARM should be directly booked for admission to the labor ward.
- The induction method and the procedures involved should be explained and verbal consent obtained.
- If delay to the induction process is required due to capacity and activity in the maternity unit then, the obstetrician should review the woman's records and appropriateness of delaying the induction and the decision should be documented in maternal records.
- Normal FHR pattern should be confirmed with EFM for 30 minutes prior to insertion of Vaginal PGE2 / PGE2 Vaginal Delivery System/ mechanical methods.
- If the woman is experiencing uterine contractions prior to planned administration of PGE2, this should be discussed with the obstetric team.
- Maternal and fetal wellbeing should be assessed at least every 4 hours, and documented while they are both inpatients.

Induction

- If following cervical assessment, the Modified Bishops Score is 7 or above then, the woman should be booked into a delivery suite for an ARM.
- In the inpatient setting, induction of labor using vaginal PGE2 should be carried out as early as possible in the morning because of higher maternal satisfaction.
- Induction of labor must not occur unless facilities are available to continuously monitor the fetal heart and uterine contractions.

Documentation

Induction of labor should be documented with the following included:

- Indication for induction.
- Pre-PGE2 CTG for 30 minutes.

- Modified Bishop's Score (for comparison later).
- Dose of Vaginal PGE2 pessary or PGE2 Vaginal Delivery System given.
- Time administered.
- Repeat CTG trace for 60 minutes after insertion of PGE2.

Monitoring Maternal Observations

- Maternal observations must include an assessment of temperature, pulse, respiratory rate, blood pressure and, where appropriate, oxygen saturation.
- An abdominal palpation must occur prior to the commencement of induction.
- Before induction of labor is carried out, the Bishop Score should be assessed and recorded.
- All maternal observations must be documented in the maternal records.

Fetal Monitoring

- CTG monitoring for at least 30 minutes should be done before insertion of vaginal PGE2 or use of mechanical methods.
- Following insertion of vaginal PGE2 or use of mechanical methods, continuous CTG monitoring should be commenced for a period of 60 minutes.
- If the CTG is classified as normal, intermittent auscultation should be used, unless there are indications for continuous fetal monitoring. With use of mechanical methods of induction of labor, fetal monitoring should begin only if the pregnant woman is complaining of contractions.
- If there are concerns regarding the CTG, these must be referred to the obstetric team.
- If the CTG shows suspicious or pathological fetal heart patterns, the woman should be managed and cared for on the labor ward or if the situation warrants to theatre for delivery.

Contraction Monitoring

- Contractions should be monitored and vaginal loss assessed.
- In cases of uterine hypercontractility, with or without FHR change, the obstetric team should be immediately informed.

Definitions

Tachysystole	• = / > 5 Contractions in 10 minutes with normal CTG
Hypertonus	• Painful contraction lasting ≥ 90 seconds: normal CTG
Hyperstimulation	• Tachysystole or hypertonus with abnormal CTG

Actions

- Continue CTG monitoring.
- Transfer to labor ward if not already in labor ward.
- If CTG is normal, wait for 15-30 mins then reassess.
- If hyperstimulation persists, administer 250 micrograms subcutaneous Terbutaline.
- Identify a clear management plan after discussion with the obstetrician and ensure that this is clearly documented in the maternity notes.

Management after One Cycle of Treatment

- Commence CTG and make a full assessment of mother and baby.
- Perform VE:
  - If the cervix is 2cm or more dilated and fully effaced, transfer to labor ward for amniotomy (ARM) +/- infusion of oxytocin.
  - If the woman is a primigravida and cervix is 2cm or more dilated, but not effaced consider administration of further vaginal PGE2.
  - If cervix is closed and an amniotomy is not possible, the woman should be assessed and further management planned by the on call obstetric team.
- The plan of care should be discussed with the woman, and it should be clearly documented in the maternity records.

Recommendation if Induction of Labor Fails

In this guideline, failed induction is defined as failure to establish labor after one cycle of treatment, consisting of the insertion of a total of 2 vaginal PGE2 3mg pessaries 6 hours apart, or 1 PGE2 Vaginal Delivery System10 mg vaginal device over 24 hours. Prior to commencing the induction process, the possibility of failure of induction should be discussed with the woman.

If induction fails, the management options are:

- A second cycle of vaginal PGE2 administration may be undertaken in discussion with the obstetrician, provided 12 hours had elapsed since the last dose or 24 hours after the first, whichever is longer. Vaginal PGE2 should be used as the chemical induction method in a second induction cycle regardless of whether PGE2 Vaginal Delivery System or vaginal PGE2 pessary was the chosen method for the first cycle.

- CS.

- Oxytocin infusion prior to ARM or a cervical balloon to dilate the cervix may be considered in exceptional circumstances after full assessment by the obstetrician and following full discussion with the woman undergoing induction of labor.

  - Use of vaginal PGE2 is advised after discussion with on call obstetrician if mechanical method has failed. No time interval needs to elapse before using Vaginal PGE2 in cases where a mechanical method has failed.

Continuous Management

- Once cervical ripening has occurred, if contractions have been established then, follow labor monitoring as per protocol.

- If contractions do not commence and on assessment of the cervix, the Modified Bishop Score is found to be greater than 7:

  - Perform ARM.
  - Encourage mobilization where appropriate.
  - If contractions are not adequate after two hours, commence oxytocin infusion as per regime.

AUGMENTATION OF LABOR: OXYTOCIN INFUSION REGIMEN

PREPARATIONS BEFORE STARTING OXYTOCIN

- Delay commencement of oxytocin infusion by 6 hours following administration of vaginal PGE2 tablet/gel, 30 min following PGE2 10 mg vaginal insert.
- Amniotomy should be performed prior to commencement of oxytocin infusion.
- Maternal and fetal assessment:
  - Vital signs
  - Abdominal palpation for contraction and resting tone
  - VE if appropriate
  - Continuous CTG

PRECAUTIONS

- Women with previous uterine scar
- Multiparous women
- Women in second stage of labor
- With high risk women i.e. cardiac, severe pre-eclampsia or eclampsia
- Multiple pregnancy

CONTRAINDICATIONS

- Known hypersensitivity to oxytocin.
- Hypertonic uterine contractions or fetal distress when delivery is not imminent.

ADVERSE EFFECTS

- Uterine hyper stimulation with excessive doses of oxytocin.
- Water intoxication, associated with administration of high doses of oxytocin together with large amounts of electrolyte-free fluid over a prolonged time
- Headache
- Tachycardia, bradycardia
- Nausea and vomiting

ADMINISTRATION

Equipements	• Volumetric pump • 10 units of oxytocin • 500 mL 0.9% sodium chloride • Mainline IV infusion set
Preperation	• Add 5 units of oxytocin (to a 500 mL bag 0.9% sodium chloride). ☐ Label bag with signed “medication added” label. ☐ Document fluid volume and drug on the Fluid Balance Record. ☐ Invert bag several times to ensure mixing of the oxytocin in the diluent fluid • Connect the infusion to the side arm of the mainline
Administration	☐ Commence the oxytocin infusion via the infusion pump (see Table 5 & 6 for oxytocin infusion) ☐ Increase the rate (see Table 1) until reaching goal of four contractions in 10 minutes, lasting at least 45 seconds each with at least 60 seconds resting tone in-between. ☐ Once 4 contractions in 10 minutes are achieved, maintain infusion rate, the infusion rate should be titrated as required to maintain four contractions in 10 minutes.

Table (5): Regimen for Oxytocin Infusion

Preparation	• Add 5 IU oxytocin (5000 milliunits) to 500 mL sodium chloride 0.9 % or ringer lactate (concentration 10 mU/mL). • Use an appropriate volumetric infusion pump • Infuse as a separate line connected to the mainline
Initial rate	12 mL / hour (2 mU / min) 0.2 mL/min (4 drops/min if no infusion pump available)
Increments	Increase every 30 minutes by 12 mL / hour (2 mU / min)
Maximum	192 mL / hour (32 mU / min)

Table (6): Oxytocin induction/augmentation of labor dosage regimen

Time	Milliunits per minute	mL per hour
0	2	12
30	4	24
60	6	36
90	8	48
120	10	60
150	12	72
180	14	84
210	16	96
240	18	108
270	20	120

SELECTED INDICATIONS FOR PLANNED CESAREAN SECTION (38-39 WEEKS)

Breech Presentation

- Women who have an uncomplicated singleton breech pregnancy at 36 weeks' gestation should be offered External Cephalic Version (ECV).

- Pregnant women with a singleton breech presentation at term, for whom ECV is contraindicated or has been unsuccessful, should be offered a CS at 38-39 weeks.

Multiple Pregnancy

- In otherwise uncomplicated twin pregnancies at term where the presentation of the first twin is cephalic, a CS should not routinely be offered.
- In twin pregnancies where the first twin is not cephalic, a planned CS is indicated at 38 weeks

Preterm Birth

Preterm birth is associated with higher neonatal morbidity and mortality. However, the effect of planned CS in improving these outcomes remains uncertain and therefore a CS **should not be offered routinely.**

Small for Gestational Age

The risk of neonatal morbidity and mortality is higher with 'small for gestational age' babies. However, the effect of planned CS in improving these outcomes remains uncertain; **therefore, CS should not routinely** be offered.

Placenta Previa

Women with a placenta that partly or completely covers the internal cervical (minor or major placenta previa) **should be offered CS.**

Cephalopelvic Disproportion (CPD) in Labor

- Pelvimetry is not useful in predicting 'failure to progress' in labor and should not be used in decision making about mode of birth.
- Shoe size, maternal height and estimations of fetal size (ultrasound or clinical examination) do not accurately predict CPD and should not be used to predict 'failure to progress' during labor.

Mother-to-Child Transmission of Maternal Infections

- **Human Immunodeficiency Virus (HIV) Infection**

  - Do not offer CS on the grounds of HIV status to prevent mother-to-child transmission of HIV to:

- Women on highly active anti-retroviral therapy with a viral load of less than 400 copies per mL or,
- Women on any anti-retroviral therapy with a viral load of less than 50 copies per mL.

➢ Inform women that in these circumstances the risk of HIV transmission is the same for CS and a vaginal birth.

➢ Consider either a vaginal birth or CS for women on anti-retroviral therapy with a viral load 50-400 copies per mL because there is insufficient evidence that a CS prevents mother-to-child transmission of HIV.

➢ Offer a CS to women with HIV who are not receiving any anti-retroviral therapy or are receiving any anti-retroviral therapy and have a viral load of 400 copies per mL or more.

- **Hepatitis B virus**

➢ Serological screening for hepatitis B should be offered to all pregnant women.

➢ Mother-to-child transmission of hepatitis B can be reduced if the baby receives immunoglobulin and vaccination.

➢ In these situations, pregnant women with hepatitis B should not be offered a planned CS because there is insufficient evidence that this reduces mother-to-child transmission of hepatitis B virus.

- **Hepatitis C virus**

➢ Women who are infected with hepatitis C should not be offered a planned CS because this does not reduce mother-to-child transmission of the virus.

➢ Pregnant women who are co-infected with hepatitis C virus and HIV should be offered a planned CS because it reduces mother-to-child transmission of both hepatitis C virus and HIV.

- **Genital herpes simplex virus (HSV)**

➢ Women with primary genital herpes simplex virus (HSV) infection occurring in the third trimester of pregnancy should be offered a planned CS because it decreases the risk of neonatal HSV infection.

➢ Pregnant women with a recurrence of HSV at birth should be informed that there is uncertainty about the effect of a planned CS in reducing the risk of neonatal HSV infection. Therefore, a CS should not routinely be offered.

- **Maternal Request**

➢ When a woman requests a CS explore, discuss and record the specific reasons for the request.

- If a woman requests a CS when there is no other indication, discuss the overall risks and benefits of a CS compared with vaginal birth and record that this discussion has taken place.
    - When a woman requests a CS because she has anxiety about childbirth, offer referral to a healthcare professional with expertise in providing perinatal mental health support to help her address her anxiety in a supportive manner.
- For all women requesting a CS, if after discussion and offer of support (including perinatal mental health support for women with anxiety about childbirth), a vaginal birth is still not an acceptable option, offer a planned CS.
- An obstetrician has the right to decline a woman's request for a CS**.** If this happens, they should refer the woman to an obstetrician in the same unit who will carry out the CS.

For more details for risk of adverse maternal and neonatal outcomes by mode of delivery, *see Annex (4).*

ANNEXES

ANNEX 1: FETAL MONITORING DURING LABOR

Patient information and discussion

Ideally, women must be made aware in the antenatal period of the options available for fetal monitoring during labor.

Fetal monitoring

Monitoring and assessment in early labor

- Offer intermittent auscultation of the FHR to women at low risk of complications in established first stage of labor. Abdominal palpation should be performed to determine the optimal area for listening to the fetal heart.
    - Use Doppler ultrasound
    - Carry out intermittent auscultation immediately after a contraction for at least 1 minute, at least every 15 minutes, and record it as a single rate
    - Record accelerations and decelerations if heard
    - Palpate the maternal pulse hourly, or more often if there are any concerns, to differentiate between the maternal and fetal heart beats
    - Enquire about the presence of fetal movements as a marker of fetal wellbeing
    - Document all findings in admission paperwork.

- **If there is a rising baseline FHR or decelerations are suspected on intermittent auscultation, actions should include:**
    - Carrying out intermittent auscultation more frequently, for example after three consecutive contractions initially.
    - Assess the complete clinical picture, including the woman's position and hydration, the strength and frequency of contractions, and maternal observations.
    - **If a rising baseline or decelerations are confirmed,** change monitoring to **continuous CTG**, and explaining to the woman why it is needed.

- Maternal pulse should be assessed at the initial assessment on admission, then it should be assessed each hour throughout labor. Also, it should be assessed if FHR abnormality is detected, to differentiate between the two heart rates.

Transferring from intermittent auscultation to continuous CTG

- If any of the following risk factors are present at the initial assessment of labor or arise during labor then the woman should have continuous CTG:

Transfer from intermittent auscultation to continuous CTG when:

- Maternal pulse over 120 beats/minute on 2 occasions 30 minutes apart.
- Temperature of 38°C or above on a single reading, or 37.5°C or above on two consecutive occasions 2 hours apart.
- Suspected chorioamnionitis or sepsis.
- Pain reported by the woman that differs from the pain normally associated with contractions.
- The presence of significant meconium.
- Fresh vaginal bleeding that develops in labor
- High risk pregnancy (maternal or fetal origin)
- Confirmed delay in the first or second stage of labor.
- Oxytocin use.
- Epidural anaesthesia.
- Breech in labor.
- Multiple pregnancy.
- Preterm pregnancy from 26 weeks
- Previous CS.
- Pre-labor rupture of membranes > 24 hour, if the patient is pyrexial.
- Pregnancy > 42weeks.
- Maternal request

If continuous CTG has been started because of concerns arising from intermittent auscultation, but the trace is normal after 20 minutes, **return to intermittent** auscultation unless the woman asks to stay on continuous CTG.

Electronic fetal monitoring (EFM) and recordkeeping

- CTGs must be labelled with the mother's name, hospital no, date and time, gestation and maternal pulse.
- The date and time clocks on the CTG machine must be correctly set and signed to confirm this on the CTG paper.
- Any intrapartum events (that may affect the FHR) should be noted on the CTG together with time and signature.
- Any member of staff who is asked to provide an opinion on a CTG should note their findings on the CTG with date, time and signature.
- If the CTG has been reviewed by the obstetrician due to fetal concerns, this should be documented in the maternal notes and the CTG signed by the obstetrician.

Methods available for recording CTG

- Continuous monitoring can be performed using an external Doppler or by applying a Fetal Scalp Electrode (FSE). FSEs are used when there is transducer losing contact regularly, making accurate interpretation of the CTG challenging.
- **Do not use a FSE** when there is risk of HIV, HBV, HCV, face presentation or other medical contraindication. FSE should be used with great caution at a gestation less than 34 weeks.
- FSE use does not rule out the possibility of recording a maternal heart rate.
- Be aware of the limitations of CTG recordings due to artifact and doubling of maternal heart rate.
- If there is any doubt with respect to origin of the CTG recording, please confirm the presence of a fetal heart using other methods such as real time ultrasound.

Systematic CTG assessment

Make a documented systematic assessment of the condition of the woman and unborn baby (including CTG findings) every hour, and document this in the intrapartum care notes using the criteria in Annex (1), or more frequently if there are concerns.

- Do not make any decision about a woman's care in labor based on CTG findings alone.
- Take into account the woman's preferences, any antenatal and intrapartum risk factors, the current wellbeing of the woman and unborn baby and the progress of labor.

Fresh Eyes

- It is recommended to use fresh eyes approach. Whenever a CTG deviates from the normal classification, an additional assessment and review of the CTG by appropriate professional should be initiated.

Principles for intrapartum CTG trace interpretation

- When reviewing the CTG, trace, assess, and document contractions and all four features of FHR: baseline rate, baseline variability, presence or absence of decelerations (and concerning characteristics of variable decelerations if present), and presence of accelerations.
- If there is a stable baseline FHR between 110 and 160 beats/minute and normal variability, continue usual care as the risk of fetal acidosis is low.
- If it is difficult to categorize or interpret a CTG trace, obtain a review by a senior obstetrician.

Baseline FHR

Use the following categorizations for baseline FHR:

Reassuring	• 110 to 160 beats/minute
Non-reassuring	• 100 to 109 beats/minute • 161 to 180 beats/minute
Abnormal	• Below 100 beats/minute • Above 180 beats/minute

<u>Consider the following when assessing baseline FHR:</u>

- Differentiate between fetal and maternal heartbeats.
- Baseline FHR will usually be between 110 and 160 beats/minute.
- Although a baseline FHR between 100 and 109 beats/minute is a non- reassuring feature, continue usual care if there is normal baseline variability and no variable or late decelerations.

Baseline variability

Use the following categorizations for FHR baseline variability:

Reassuring	• 5 to 25 beats/minute
Non-reassuring	• Less than 5 beats/minute for 30 to 50minutes • More than 25 beats/minute for 15 to 25minutes
Abnormal	• Less than 5 beats/minute for more than 50minutes • More than 25 beats/minute for more than 25minutes • Sinusoidal pattern

Consider the following when assessing FHR baseline variability

- Baseline variability will usually be between five and 25 beats/minute.
- Intermittent periods of reduced baseline variability are normal, especially during periods of quiescence ('sleep').

Accelerations

- The presence of FHR accelerations, even with reduced baseline variability, is generally a sign that the baby is healthy. The absence of accelerations on an otherwise normal CTG trace does not indicate fetal acidosis.

Decelerations

When describing decelerations in FHR, specify:

- Their timing in relation to the peaks of the contractions
- The duration of the individual decelerations
- Whether or not the FHR returns to baseline
- How long they have been present for
- Whether they occur with over 50% of contractions
- The presence or absence of a biphasic (W)shape
- The presence or absence of shouldering
- The presence or absence of reduced variability within the deceleration.
- Describe decelerations as 'early', 'variable' or 'late'.

Regard the following as concerning (previously termed "atypical") characteristics of variable decelerations:

- Lasting more than 60 seconds
- Reduced baseline variability within the deceleration
- Failure to return to baseline
- Biphasic (W) shape
- No shouldering.

- Use the following categorizations for decelerations in FHR:

Reassuring	• No decelerations • Early decelerations • Variable decelerations with no concerning characteristics for less than 90 minutes
Non-reassuring	• Variable decelerations with no concerning characteristics for 90 minutes or more • Variable decelerations with any concerning characteristics in up to 50% of contractions for 30 minutes or more • Variable decelerations with any concerning characteristics in over 50% of contractions for less than 30minutes. • Late decelerations in over 50% of contractions for less than 30 minutes, with no maternal or fetal clinical risk factors such as vaginal bleeding or significant meconium
Abnormal	• Variable decelerations with any concerning characteristics in over 50% of contractions for 30 minutes (or less if there are any maternal or fetal clinical risk factors). • Late decelerations for 30 minutes (or less if there are any maternal or fetal clinical risk factors) • Acute bradycardia, or a single prolonged deceleration lasting 3 minutes or more.

If variable decelerations with no concerning characteristics are observed:

- Be aware that these are very common, can be a normal feature in an otherwise uncomplicated labor and birth, and are usually a result of cord compression
- Ask the woman to change position or mobilize.

Consider the following when assessing decelerations in FHR:

- Early decelerations are uncommon, benign and usually associated with head compression
- Early decelerations with no non-reassuring or abnormal features on the cardiotocograph trace should not prompt further action.
- Take into account that the longer and later the individual decelerations, the higher the risk of fetal acidosis (particularly if the decelerations are accompanied by tachycardia or reduced baseline variability).

Table (7): NICE guidelines (2017) for CTG interpretation and classification

Documentation proforma for intrapartum CTG interpretation (based on NICE 2017)					
1. Review the Clinical Picture **Maternal Risks:** **Gestation:** **Temp and MatHR:**		**Fetal Risks:** **Liquor:**		**Contraction frequency:** **Dilatation:**	
2. CTG features	**Reassuring**	**Non-reassuring**		**Abnormal**	
Baseline FHR (bpm)	110-160 bpm	100-109 bpm or 161-180 bpm		Less than 100 bpm or more than 180 bpm	
Variability (bpm)	5 -25 bpm	Less than 5 bpm for 30-50 mins More than 25 bpm for 15-25 mins		Less than 5 bpm for more than 50 mins, or More than 25 bpm for more than 25 mins, or sinusoidal pattern	
Accelerations	If present are generally a sign that the baby is healthy Absence of accelerations in otherwise normal CTG does not indicate fetal acidosis				
Decelerations "Concerning" features of a variable deceleration include: Last more than 60 seconds Reduced baseline variability within Failure to return to baseline Biphasic (W)shape No shouldering	None Early Variable decelerations with no concerning features for less than 90 mins	Variable decelerations with no concerning features for more than 90 mins	Variable Decelerations with any concerning features in up to 50% of contractions for 30 mins or more, or in over 50% contractions for less than 30mins	Late decelerations in over 50% of contractions for less than 30 mins	Variable decelerations with any concerning feature in over 50% contractions for more than 30 mins Late decelerations for 30 mins (less if risk factors present) Acute bradycardia, or single prolonged deceleration lasting 3 mins or more

3. Impression and plan			
Opinion	Normal CTG 4 features reassuring	Suspicious CTG 1 non-reassuring and 2 reassuring features	Pathological CTG 1 abnormal or 2 non-reassuring features
Management Plan	Continue CTG and normal care	Correct hypotension/hyperstimulation Full set of maternal observations Inform an obstetrician/senior MW Review whole clinical picture and CTG findings and document a plan	Obstetric or senior MW review Exclude acute events Correct hypotension/ hyperstimulation Conservative measures Scalp stimulation/FBS Consider delivery
Date	Time	Signature/Name	Signature/Name

Categorization of CTG traces

Categories CTG traces as follows:

- **Normal**: all features are reassuring
- **Suspicious**: 1 non-reassuring feature and 2 reassuring features (but note that if accelerations are present, fetal acidosis is unlikely)
- **Pathological**:
  - One abnormal feature **or**
  - Two non-reassuring features.

Management of CTG traces

- If there is a stable baseline FHR between 110 and 160 beats/minute and normal variability, continue usual care as the risk of fetal acidosis is low.

Acute bradycardia

- If there is an acute bradycardia, or a single prolonged deceleration for 3 minutes or more:

- Urgently seek obstetric help.
- check for an acute event (for example, cord prolapse, suspected placental abruption or suspected uterine rupture),
- Correct any underlying causes, such as hypotension or uterine hyperstimulation.
- Start one or more conservative measures.
- Prepare for an urgent birth.
- Expedite the birth if the acute bradycardia persists for 9 minutes.

If the FHR recovers at any time up to 9 minutes, reassess any decision to expedite the birth, in discussion with the woman.

Pathological

If the CTG trace is categorized as pathological:

- Obtain a review by an obstetrician
- Exclude acute events (for example, cord prolapse, suspected placental abruption or suspected uterine rupture).
- Correct any underlying causes, such as hypotension or uterine hyperstimulation.
- Start one or more conservative measures.
- Talk to the woman

If the CTG trace is still pathological after implementing conservative measures:

- Obtain a further review by an obstetrician
- Offer digital fetal scalp stimulation and document the outcome.

If the CTG trace is still pathological after fetal scalp stimulation, consider:

- Fetal blood sampling **or**
- Expediting the birth

Suspicious

If the CTG trace is categorized as suspicious:

- Correct any underlying causes, such as hypotension or uterine hyperstimulation.
- Perform a full set of maternal observations.
- Start one or more conservative measures.
- Inform an obstetrician.
- Document a plan for reviewing the completely clinical picture.

Normal

If the CTG trace is categorized as normal:

- Continue CTG (unless it was started because of concerns arising from intermittent auscultation and there are no ongoing risk factors) and continue usual care

Conservative Measures

If there are any concerns about the baby's wellbeing, be aware of the possible underlying causes and start one or more of the following conservative measures based on an assessment of the most likely cause(s):

- Encourage the woman to mobilize or adopt an alternative position (and to avoid being supine).
- give intravenous fluids if the woman is hypotensive
- reduce contraction frequency by:
    - Reducing or stopping oxytocin if it is being used and/or
    - Giving a tocolytic drug (a suggested regimen is subcutaneous terbutaline 250mcg).

Intrauterine resuscitation

- Do not use maternal facial oxygen therapy for intrauterine fetal resuscitation, because it may harm the baby (but it can be used where it is administered for maternal indications such as hypoxia or as part of pre-oxygenation before a potential anesthetic).
- Do not offer amnioinfusion for intrauterine fetal resuscitation.

Fetal scalp stimulation

If the CTG trace is pathological, offer digital fetal scalp stimulation:

- If this leads to no acceleration in FHR, **continue with fetal blood sampling or delivery**
- If digital fetal scalp stimulation (during VE) leads to acceleration in FHR, regard this as a sign that the baby is healthy. Take this into account when

Fetal blood sampling

- Do not carry out fetal blood sampling if:
  - There is an acute event (for example, cord prolapse, suspected placental abruption or suspected uterine rupture) **or**
  - The whole clinical picture indicates that the birth should be expedited **or**
  - Contraindications are present, including risk of maternal-to-fetal transmission of infection or risk of fetal bleeding disorders.

Be aware that for women with sepsis or significant meconium, fetal blood sample results may be falsely reassuring, and always discuss with a consultant obstetrician:

- Whether fetal blood sampling is appropriate
- Any results from the procedure if carried out.

- Before carrying out or repeating fetal blood sampling, start conservative measures and offer digital fetal scalp stimulation. Only continue with fetal blood sampling if the cardiotocograph trace remains pathological.
- When considering fetal blood sampling, explain the following to the woman:
  - Why the test is being considered and other options available
  - The procedure in details and expected results

- If a fetal blood sample cannot be obtained but there are FHR accelerations in response to the procedure, this is encouraging. In these circumstances, expediting the birth may not be necessary.
- If a fetal blood sample cannot be obtained and the CTG trace has not improved, expediting the birth will be advised.
- CS or instrumental birth (forceps or ventouse) may be advised, depending on the results of the procedure.

- Do not take a fetal blood sample during or immediately after a prolonged deceleration.
- Take fetal blood samples with the woman in the left-lateral position.
- Use either pH or lactate when interpreting fetal blood sample results.
- Use the following classifications in below table:

Table (8): classifications for fetal blood sample result.

PH	Lactate
Normal: 7.25 or above Borderline: 7.21 to7.24 Abnormal: 7.20 or below	Normal: 4.1 mmol/l or below Borderline: 4.2 to 4.8mmol/l Abnormal: 4.9 mmol/l or above

Interpret fetal blood sample results taking into account:

- Any previous pH or lactate measurement and
- The clinical features of the woman and baby, such as rate of progress in labor.

If the fetal blood sample result is abnormal:

- Inform a senior obstetrician and the neonatal team **and**
- Talk to the woman.
- Expedite the birth.

If the fetal blood sample result is borderline

- And there are no accelerations in response to fetal scalp stimulation, consider taking a second fetal blood sample no more than 30 minutes later if this is still indicated by the CTG trace.

If the fetal blood sample result is normal

- And there are no accelerations in response to fetal scalp stimulation, consider taking a second fetal blood sample no more than 1 hour later if this is still indicated by the CTG trace.

- Discuss with a consultant obstetrician if a third fetal blood sample is thought to be needed.

When a fetal blood sample cannot be obtained

- If fetal blood sampling is attempted and a sample cannot be obtained, but the associated fetal scalp stimulation results in a FHR acceleration, decide whether to continue the labor or expedite the birth in light of the clinical circumstances and in discussion with the woman and a senior obstetrician.

- If fetal blood sampling is attempted but a sample cannot be obtained and there has been no improvement in the CTG trace, expedite the birth.

End of Labor

- Following birth, the healthcare professional should sign and note the date, time and mode of birth on the CTG.

- Cord blood sample should be taken for PH measurements after delivery.

Support for parents in cases of actual or suspected fetal compromise and poor outcome of baby

- The cord pH is useful information to have when counselling parents of babies who encounter problems in the neonatal period.

- The neonatologist must be informed in cases of actual or suspected poor outcome for the baby.

- The consultant neonatologist and consultant obstetrician should meet with the parents to discuss the labor, delivery, and the possible prognosis for the baby. The details of what was discussed must be documented in the baby's medical record, or if these meetings have been performed separately then the both consultants should document in the mother's obstetric Medical record.

Storage of CTGs

- All CTGs should be stored in brown, sealed envelopes, and attached securely to the obstetric notes.

ANNEX 2: METHODS FOR INDUCTION OF LABOR

PGE2 Vaginal Delivery System Method of Induction

- The rate of hyperstimulation is similar to other PGE2 preparations (approximately 4%) but PGE2 Vaginal Delivery System has the advantage of being easy to remove (by means of the retrieval tape) reversing this complication within minutes (half-life 1-3 minutes).

- The main advantages are that with a single administration in a 24 hours period, less VEs are required and delays associated with the administration of subsequent Vaginal PGE2 tablets are avoided. PGE2 Vaginal Delivery System aims to reduce the induction to delivery interval and ideally reduce the number of hours spent in hospital. Fewer internal examinations and delays may improve women's satisfaction.

PGE2 Vaginal Delivery System **should only be used for those with an unfavorable cervix (Bishops Score< 7), where it is likely that more than one Vaginal PGE2 pessary would be used.**

• PGE2 Vaginal Delivery System must be stored in a freezer at -10-25 degrees Celsius.

• Infusion of oxytocin should not be started until > 30 minutes after removal of PGE2 Vaginal Delivery System.

• If PGE2 Vaginal Delivery System falls out it should be repositioned.

• If PGE2 Vaginal Delivery System has fallen and not re-usable consider administering Vaginal PGE2 3mg pessary after 6 hours of rest. Do not insert a new PGE2 Vaginal Delivery Systemvaginal device as this will result in drug overdose.

PGE2 Vaginal Delivery System **should not be used in the presence of a uterine scar, where contractions are already present, or if the CTG is not thought to be reassuring.**

PGE2 Vaginal Delivery System Insertion:

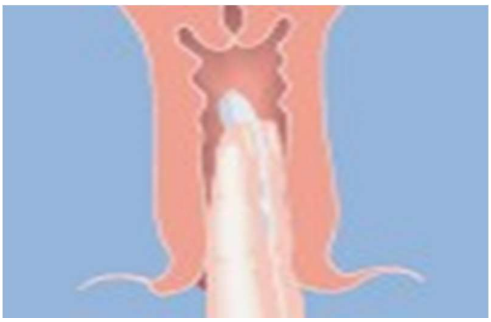
- Remove PGE2 Vaginal Delivery System from the freezer 20 minutes before administering (although thawing is not required before use).

- Insert PGE2 Vaginal Delivery System high into the posterior fornix using aquagel

- The pessary should lie transversely in the posterior fornix.

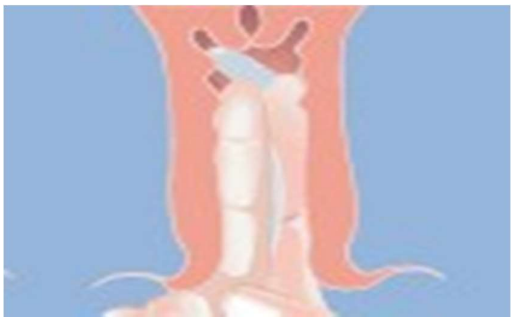
- After PGE2 Vaginal Delivery System has been inserted the withdrawal tape may be cut but ensure that there is sufficient tape outside the vagina to allow removal. No attempt should be made to tuck the end of the tape into the vagina.

Figure1: PGE2 Vaginal Delivery System **Insertion**



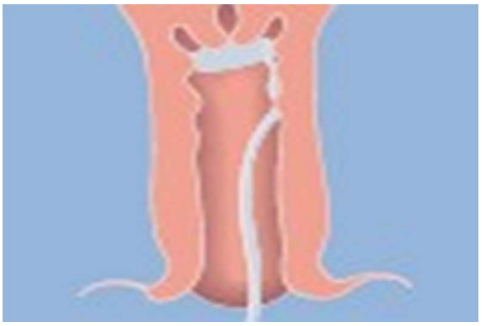
1. Insertion

Holding the PGE2 Vaginal Delivery System insert between the index and middle fingers of the examining hand, insert it high into the vagina towards the posterior vaginal fornix using only small amounts of water-soluble lubricants.



2. Positioning

The index and middle fingers should now be twisted a quarter turn clockwise, pushing the PGE2 Vaginal Delivery System insert higher up, behind the posterior fornix and turning it through 90° so that it lies transversely in the posterior fornix.



3. After positioning

Carefully withdraw the fingers leaving the PGE2 Vaginal Delivery System insert in the position shown in this diagram where it should remain in situ.

After insertion ensure that the patient remains recumbent for 20-30 minutes to allow time for the PGE2 Vaginal Delivery System insert to swell.

Again, this will help it to remain in place for the duration of the treatment. Allow sufficient tape to remain outside the vagina to permit easy retrieval.

4. Removal

To stop PGE2 release, gently pull the retrieval tape and remove the PGE2 Vaginal Delivery System insert.

Post PGE2 Vaginal Delivery System Insertion:

- The woman will remain recumbent for 30 minutes after insertion
- Continue CTG for one hour.
- Note any adverse effects (nausea, vomiting, tachycardia, hypotension, fever, vaginal irritation, abdominal pain, vaginal bleeding, hypertonic uterine activity, abnormal CTG). If any adverse effect, the woman must be reviewed by an obstetrician.

When to remove PGE2 Vaginal Delivery System

PGE2 Vaginal Delivery System is designed to remain in the vagina for up to 24 hours; however, it should be removed immediately in the following instances:

- When labor is established (cervix > 3 cms with regular contractions)
- Vaginal bleeding
- Uterine hyperstimulation (uterine contractions with CTG abnormalities)
- Evidence of fetal compromise
- Evidence of maternal adverse dinoprostone effects
- At least 30 minutes prior to starting an intravenous infusion of oxytocin
- Following 24 hours, even if labor is not established
- If rupture of membranes and if labor is not established in 24 hours
- Amniotomy

To remove PGE2 Vaginal Delivery System, apply gentle traction on the retrieval tape (the insert will have swollen to two to three times its original size and be pliable). The time of the PGE2 Vaginal Delivery System removal should be documented in the maternity records.

- After 24 hours, the PGE2 Vaginal Delivery System should be removed and the woman assessed. ARM should be performed if possible. Oxytocin can be initiated within 30 minutes of removing the pessary.

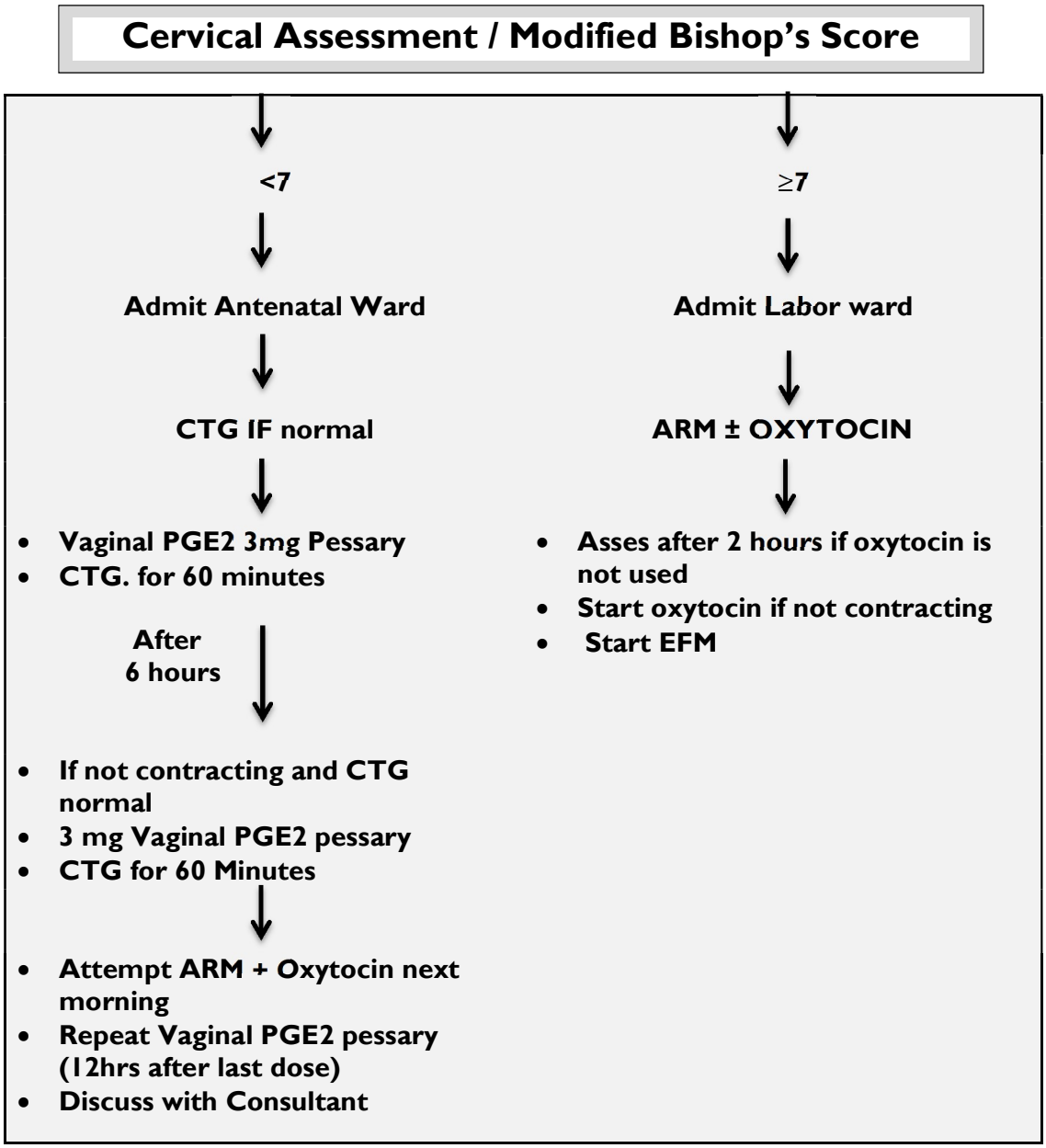
Decisions regarding how to proceed with management of failed PGE2 Vaginal Delivery System IOL where ARM is not possible will be made by the obstetrician and must be clearly documented in maternity notes.

Options:

- Vaginal PGE2 (once only) to be inserted following PGE2 Vaginal Delivery System removal.
- Abandon induction and try again at a later date.
- Deliver by CS if labor does not establish and the cervix remains unfavorable
- No further PGE2 Vaginal Delivery System should be given.

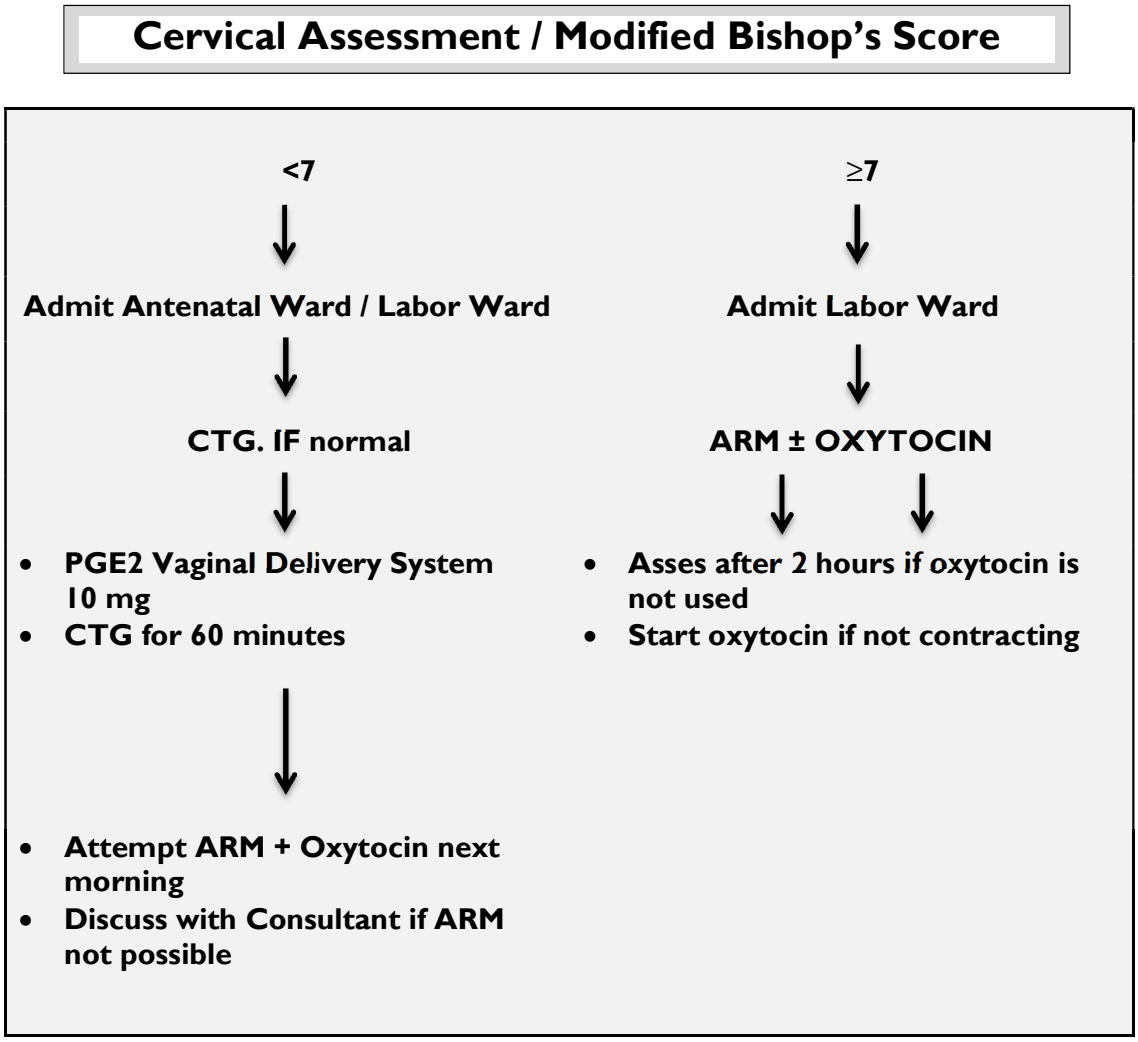
Vaginal PGE2 Method of Induction Flowchart

Vaginal PGE2 Pessary pathway



IF INDUCTION OF LABOR COMMENCED WITH VAGINAL PGE2 PESSARY – CONTINUE WITH VAGINAL PGE2 PESSARY

In particular, circumstances where there is a high risk to fetus or mother (e.g., IUGR/urgent medical problems) other management strategies may apply.



IF IOL COMMENCED WITH PGE2 Vaginal Delivery System**– NO FURTHER** PGE2 Vaginal Delivery System

Use of a Double-Balloon Catheter for Cervical Ripening

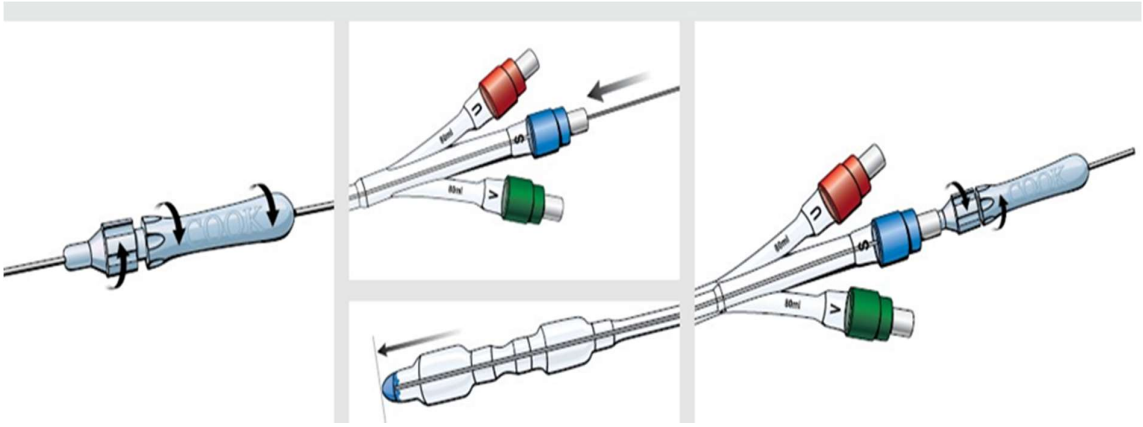
Instructions for use

STEP 1

Loosen the fitting on the proximal hub of the stylet and adjust the wire so that the distal tip of the stylet is even with the distal tip of the Cervical Ripening Balloon.

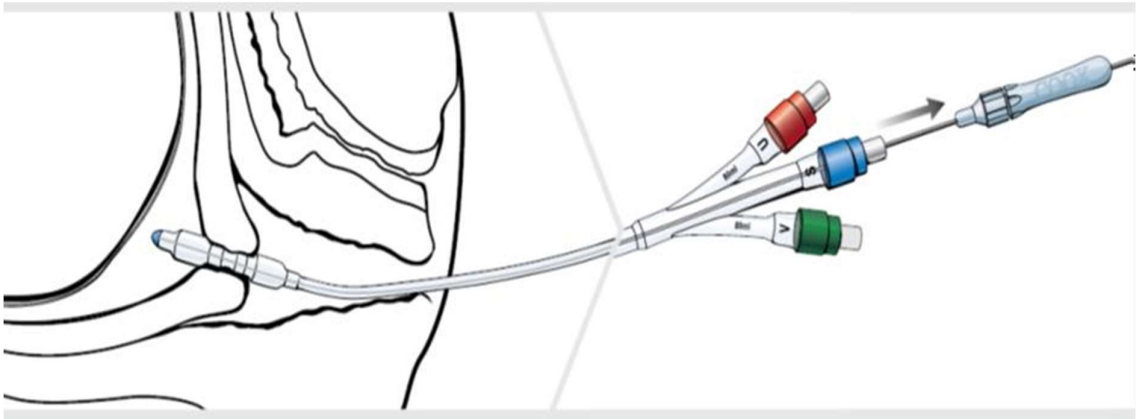
STEP 2

Tighten the fitting so that the wire does not move during manipulation, and seat the adjustable handle firmly into the blue port labelled "S"



STEP 3

If necessary, use the stylet with the Cervical Ripening Balloon to transverse the cervix. Note: Once the cervix has been traversed and the uterine balloon is above the level of the internal uterine opening (internal os), remove the stylet before further advancing the catheter.

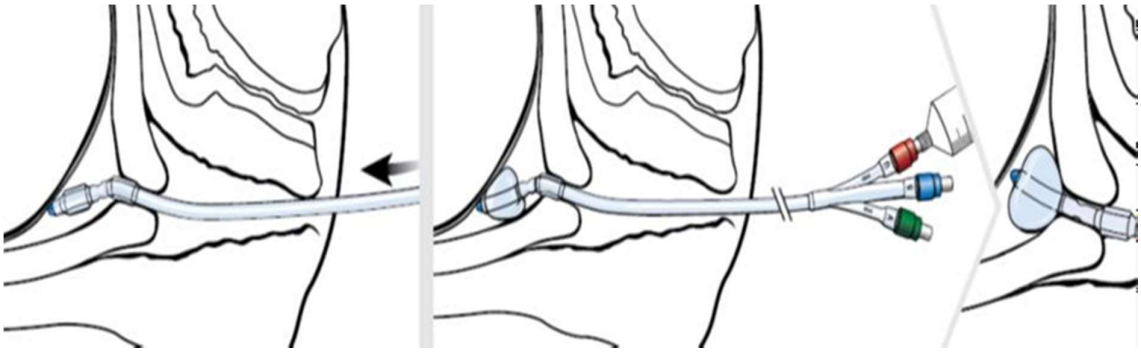


STEP 4

Advance the Cervical Ripening Balloon through the cervix until both balloons have entered the cervical canal.

STEP 5

Inflate the uterine balloon with 40 mL of saline. Once the uterine balloon is inflated, pull the device back until the balloon abuts the internal cervical os.

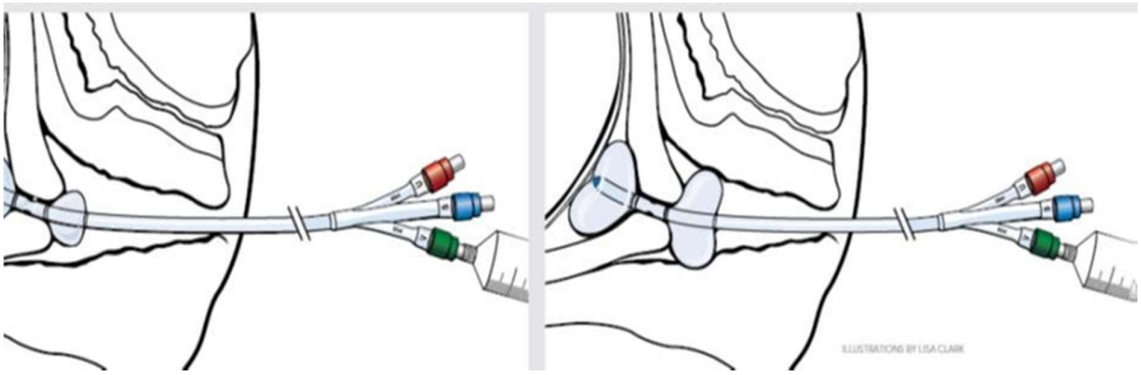


STEP 6

The vaginal balloon is now visible outside the external cervical os and should be inflated with 20 mL of saline.

STEP 7

Once the balloons are situated on each side of the cervix and the device has been fixed in place, add more fluid to each balloon in turn, until each balloon contains a maximum of 80 mL of fluid. Remove the balloon after 12 hours, or when the patient is in active labor.



STEP 8 (REMOVAL)

After 12 hours, deflate both balloons and remove the catheter. The patient should be able to have an ARM. Follow the induction of labor guideline at this stage. The device should now be discarded, and disposed of safely.

Use of a Foley Catheter for Induction of Labor

A Foley catheter can be used as an alternative to vaginal PGE2 for cervical ripening as part of the induction of labor process. The use of a Foley catheter eliminates the risks of hyperstimulation associated with the use of vaginal PGE2. This makes it ideal for use in women who have hyper stimulated with the use of vaginal PGE2 or who have had a previous delivery by CS.

Equipment needed:

- Vaginal pack.
- Cusco's speculum.
- Aseptic cleaning solution.
- Foley catheter 16F.
- 30ml sterile saline or water in 50ml syringe.
- Sponge holder.
- Sterile gloves.
- Cord clamp.
- Light source.

Procedure:

30 min CTG prior to procedure:

- Clean perineum and vagina.
- Use Cusco's speculum to visualize cervix (an amnioscopecan be used when the cervix is obscured by vaginal wall).
- Clean the cervix with aseptic solution.
- Using sponge forceps insert tip of Foley catheter through external os.
- Feed catheter through the internal os.
- Once past the internal os inflate the Foley catheter balloon with 30ml N/saline or water.
- Use the cord clamp to occlude the open, external end of the catheter [where the urine bag would normally be attached].
- Tape the lower 1/3 of the catheter under slight traction to the inner thigh.
- 60 min CTG after insertion of Foley catheter.
- Once the balloon is expelled from the vagina spontaneously, perform a VE & ARM and proceed with induction of labor.
- If after 24 hours the balloon has not been spontaneously expelled, the balloon should be deflated and removed. A vaginal assessment should be made to see if an ARM is possible. If an ARM is not possible, following discussion with the obstetric consultant on call delivery by LSCS could be considered.

ANNEX 3: WHO PARTOGRAPH IN MANAGEMENT OF LABOR

IMPAC: Managing Complications in Pregnancy and Childbirth: A Guide for midwives and doctors WHO/RHR/00.7

Definition

A partograph is a graphical record of progress during labor developed and extensively tested by the WHO. Progress of labor measured by cervical dilation against time in hours, and a record is made of the important conditions of the mother and fetus that may arise during the labor process.

Purposes of the partograph

- To detect abnormal progress of labor as early as possible.
- To prevent prolonged labor.
- To recognize CPD long before obstructed labor.
- To assist in early decision on augmentation or termination of labor.
- To increase the quality and regularity of all observations of mother and fetus.
- To recognize maternal or fetal problems as early as possible.

Components of the partograph

Client information: Record the woman's name, gravida, para, hospital number, date and time of admission, and time of ruptured membranes or time elapsed since rupture of membranes (if rupture occurred before charting on the partograph began).

- Part I : Assessment of the fetal condition
- Part II : Progress of labor
- Part III : Assessment of the maternal condition
- Part IV : Outcome of labor

Client information: Record the woman's name, gravida, para, hospital number, date and time of admission, and time of ruptured membranes or Time elapsed since rupture of membranes (if rupture occurred before charting on the partograph began).

Part I: Assessment of the fetal condition

The first section of the graph is used to monitor and assess the fetal condition (Figure 16.1).

- FHR
  - >150 beats/min = Tachycardia
  - < 110 beats/min = Bradycardia
  - < 100 beats/min = Severe bradycardia

  FHR: Record every half hour.

- Membranes and liquor

- Plotting of the condition of the membranes and liquor in the partograph is as follows:
  - **I**ntact membranes **I**
  - Ruptured membranes + **C**lear liquor **C**
  - Ruptured membranes + **M**econium stained liquor **M**
  - Ruptured membranes + **B**lood-stained liquor **B**
  - Ruptured membranes + **A**bsent liquor **A**
- Molding of the fetal skull bones

  Molding is an important indication of how adequately the pelvis can accommodate the fetal head. Plotted as follows:
  - Separated bones, sutures felt easily → 0
  - Bones just touching each other → +
  - Overlapping bones (reducible) → + +
  - Severely overlapping bones (non-reducible) → + + +

  Increasing molding with the head high in the pelvis is an ominous sign of CPD.

Part II: Progress of labor

- Cervical dilation

  The next section of the partograph has as its central feature a graph of cervical dilation against time. Dilation of the cervix is plotted (recorded) with a cross (X).
  - The active phase starts when the cervix reaches 4 cm dilation.

    Contractions occur three times every 10 minutes, with each lasting > 40 seconds and the cervix should dilate at a rate of 1 cm/hour or faster.
  - Alert Line

    The Alert Line drawn from 4 cm to 10 cm dilation represents the rate of dilation of 1 cm/hour.
  - Action Line

    The Action Line is drawn four hours to the right of the Alert Line and parallel to it. This is the critical line at which specific management decisions must be made.

Part III: Assessment of the maternal condition

- Assess maternal condition regularly by monitoring:
  - Blood pressure hourly, Pulse and Temperature every 2 hours.
  - Urine volume, analysis for protein and Acetone
  - Drugs, IV fluids

Part IV: Outcome of labor

- Record the outcome of delivery, e.g., outcome: normal vaginal delivery of a female living baby with weight of 3.5 kg.

The Partograph should be enlarged to full size before use. Record the following on the partograph:

Client information: Record the woman's name, gravida, para, hospital number, date and time of admission, and time of ruptured membranes or time elapsed since rupture of membranes (if rupture occurred before charting on the partograph began).

FHR: Record every half hour.

Amniotic fluid: Record the color of the amniotic fluid and the status of membranes at every VE:

- I: membranes **I**ntact.
- R: membranes **R**uptured.
- C: membranes ruptured, **C**lear fluid.
- M: **M**econium-stained fluid.
- B: **B**loodstained fluid.

Molding:

1. Sutures apposed.

2. Sutures overlapped but reducible.

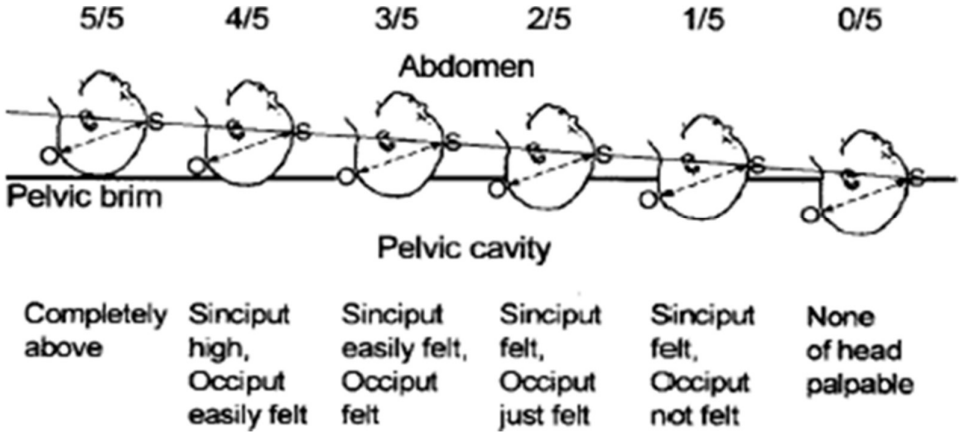
3. Sutures overlapped and not reducible.

Cervical dilatation: Assess at every VE and mark a cross (X) on the partograph. Begin plotting on the partograph at 4 cm.

Alert line: A line starts at 4 cm of cervical dilatation to the point of expected full dilatation at the rate of 1 cm per hour.

Action line: Parallel and four hours to the right of the alert line.

Descent assessed by abdominal palpation: Refers to the part of the head (divided into five parts) palpable above the symphysis pubis. Record as a circle (O) at every abdominal examination. At 0/5, the sinciput (S) is at the level of the symphysis pubis.



Hours: Record the time elapsed since onset of active phase of labor (observed or extrapolated).

Time: Record actual time.

Contractions: Chart every half hour; count the number of contractions in a 10-minute time period and their duration in seconds:

- Less than 20 seconds:
- Between 20 and 40 seconds:
- More than 40 seconds:

Oxytocin: Record the amount of oxytocin per volume IV fluids in drops per minute every 30 minutes when used.

Drugs given: Record any additional drugs given.

Pulse: Record every 30 minutes and mark with a dot (●).

Blood pressure: Record every four hours and mark with arrows.

Temperature: Record every two hours.

Protein, acetone and ketones, and volume: Record when urine passes.

ANNEX 4: RISK OF ADVERSE MATERNAL AND NEONATAL OUTCOMES BY MODE OF DELIVERY

Childbirth by its very nature carries potential risks for the woman and her baby, regardless of the route of delivery. For certain clinical conditions—such as placenta previa or uterine rupture—cesarean delivery is firmly established as the safest route of delivery. However, for most pregnancies, which are low-risk, cesarean delivery appears to pose greater risk of maternal morbidity and mortality than vaginal delivery (Table 1).

Table (9): Risk of Adverse Maternal and Neonatal Outcomes by Mode of Delivery

Outcome	Risk	
Maternal	Vaginal delivery	Cesarean delivery
Overall severe morbidity and mortality	8.6% 0.9%	9.2% 2.7%
Maternal mortality	3.6:100,000	13.3:100,000
Amniotic fluid embolism	3.3–7.7:100,000	15.8:100,000
Third-degree or fourth-degree perineal laceration|	1.0–3.0%	NA (scheduled)
Placental abnormalities	Increased with prior cesarean delivery versus vaginal delivery, and risk continues to increase with each subsequent cesarean delivery	
Postpartum depression|	No difference between cesarean delivery and vaginal delivery.	
Urinary incontinence	No difference between cesarean delivery and vaginal delivery at 2 years	
Neonatal		
Laceration	NA	1.0–2.0%
Respiratory morbidity	< 1.0%	1.0–4.0% (without labor)
Shoulder dystocia	1.0 –2.0%	0%

ANNEX 5: MANAGEMENT OF LABOR TO REDUCE UNNECESSARY CESAREAN SECTION

During Latent first stage: Offer individualized support and encouragement to remain at or return home for women who seek advice or attend with painful contractions and who are not in established labor

Initial assessment - including:
•Physical and emotional assessment
•Empathic verbal assessment of pain (using verbal numeric pain score), and desire for pain relief.

First Stage of Labor

The **first stage** begins with regular uterine contractions and ends with complete cervical dilatation.

Recommended Interventions

- 4 hourly temp, BP.
- Hourly pulse.
- Half-hourly frequency of contractions.
- Offer 4 hourly vaginal examinations.
- 4 hourly empathic assessment of pain (using verbal numerical score).
- Assessment the need for pain relief.
- Ongoing consideration of the woman's emotional and psychological needs.
- Use of a Partogram is recommended.
- Encourage the women to empty her bladder regularly.
- Encourage mobility and adopt the position women find most comfortable.
- Encourage women to drink during labor and may take a light diet.

Interventions that should not be routinely offered

- Amniotomy
- Oxytocin

Second Stage of Labor

The **second stage** begins when the cervix is completely dilated, and ends with the delivery of baby.

Recommended Interventions

- Encourage women to adopt any position they find comfortable.
- Pushing should be guided by the woman's own urges.
- If woman has regional analgesia in place, pushing should be delayed for at least 1 hour and longer if the woman wishes, unless woman has urge to push or baby's head is visible.
- Hourly BP and pulse, 4 hourly temp.
- Offer hourly vaginal examinations.
- Fetal heart should be checked after each contraction.
- Document the frequency and duration of the uterine contractions.
- Look for any vaginal bleeding.
- Document the progress of labor.
- **Episiotomy should not be offered routinely.**

Active Management of Labor

(CTG for 20 minutes).

- Not recommended for routine management of women admitted in spontaneous labor.
- Used in special circumstances and busy delivery units where there is a need for rapid turnover.

Eligibility criteria for Active Management

- Term uncomplicated pregnancy
- Singleton fetus in a cephalic presentation
- Spontaneous onset of labor.

Protocol for active-management labor:

- One-to-one nursing care if possible.
- Standardized criteria for the diagnosis of labor:
- **Diagnosis of true labor should be made by the obstetrician based on the following criteria:**
  - Painful regular contractions accompanied by effacement of at least 80 percent, bloody show (not precipitated by vaginal examination), or spontaneous rupture of the membranes.
  - The cervix should be 3-4 cm dilated.

Delay in First Stage of Labor

Nulliparous women: Cervical dilatation < 2cm in 4 hours with descent and rotation of fetal head.

Parous women: Cervical dilatation of < 2cm in 4 hours, or a slowing in the progress of labor.

Intact membranes

- Offer amniotomy, support and pain- relieving strategies.

Ruptured membranes

- *Less than 4 hours* – wait until 4 hours has passed since membrane rupture,
- *If more than 4 hours:* Experienced obstetrician consultation.

Discuss oxytocin with continuous CTG

Delay in Second Stage of Labor

Longer than 2 hours for nulliparous Longer than 1 hour for parous women

Recommended Interventions

Nulliparous women: Offer amniotomy, oxytocin with regional analgesia.

Parous women: Offer amniotomy

Obstetrician review for oxytocin administration.**Expected Outcome**

Nulliparous women: Birth would be expected to take place within 3hours of the onset of active second stage of labor.

Parous women: Birth would be expected to take place within 2 hours of the onset of active second stage of labor.

Review by expert Obstetrician to decide between instrumental vaginal birth or C/S.

Fetal Monitoring

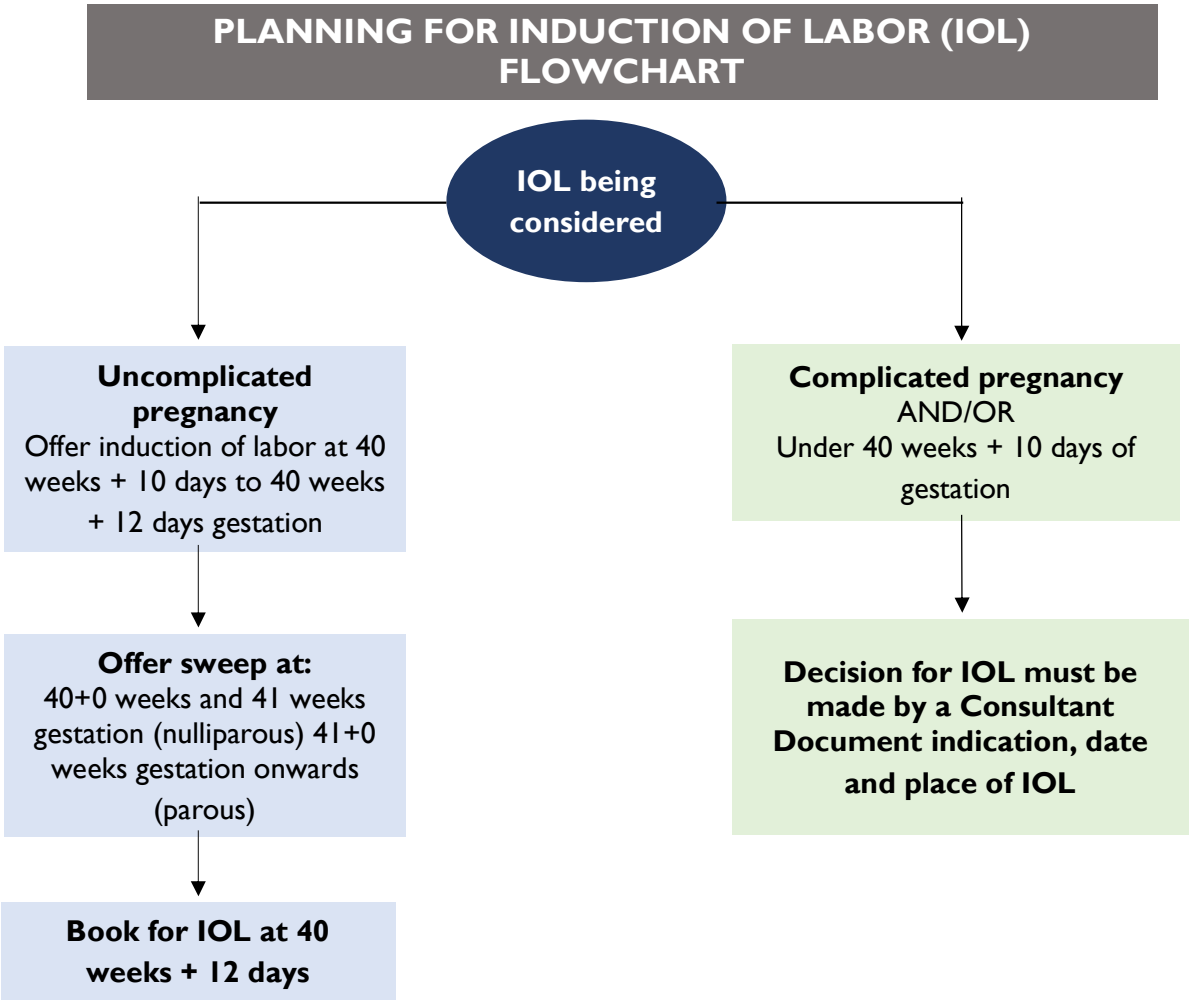
For low risk women

Intermittent auscultation for a minute at least every 15 minutes in the first stage and every 5 minutes in the second stage

Criteria for continuous CTG

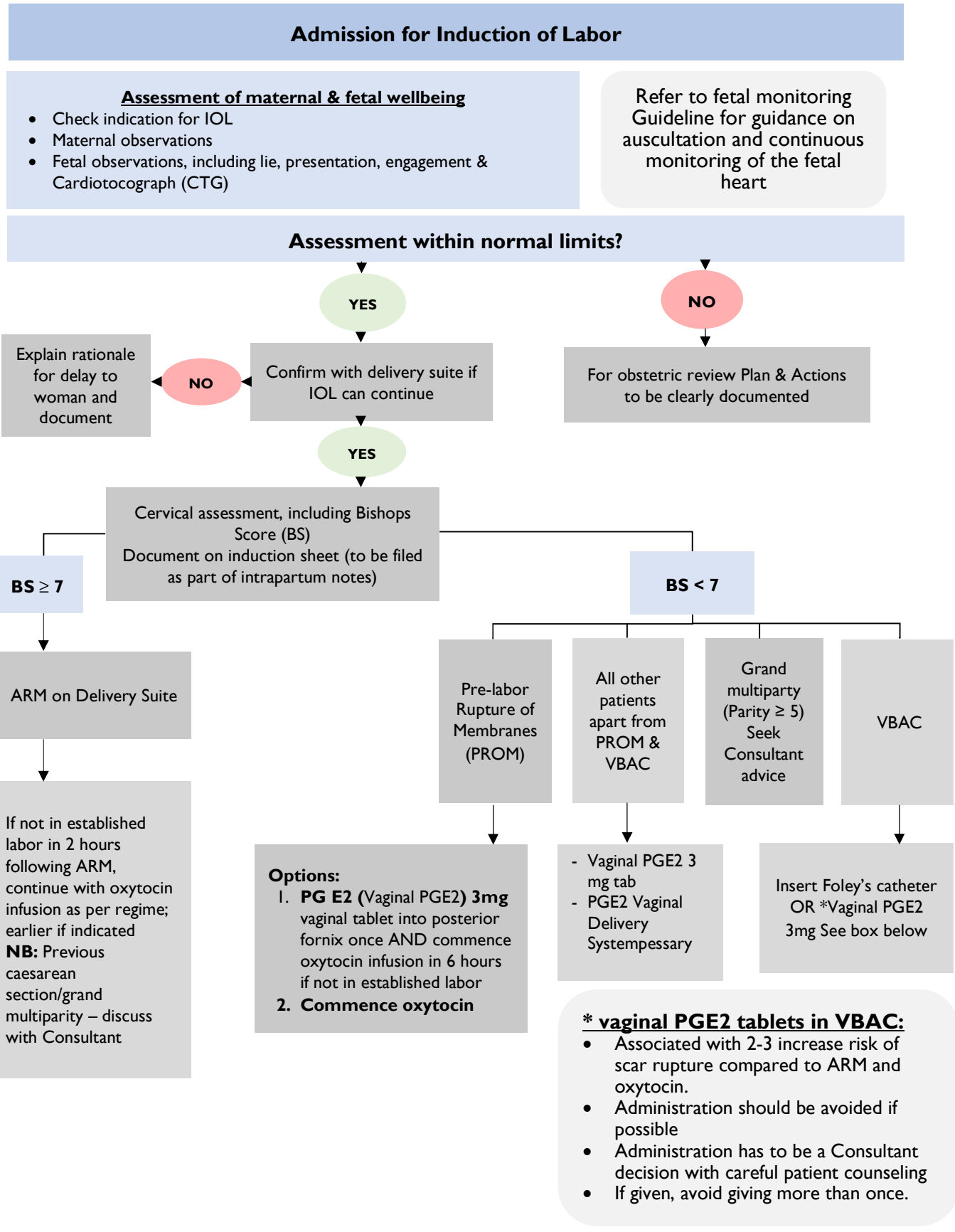
- Abnormal FHR on auscultation
- Meconium
- Maternal pyrexia
- Fresh bleeding developing in labor
- Oxytocin augmentation
- Maternal request
- During establishing or after further bolus of regional analgesia

ANNEX 6: INDUCTION OF LABOR FLOWCHARTS



When planning IOL:

- Counsel patient regarding the risks associated with IOL process as well as those associated with delaying the timing of IOL.
- Document discussion, indication & planned IOL date.
- Before booking check availability on relevant ward/delivery suite; where possible, adhere to agreed daily limit of women for IOL.


Admission for Induction of Labor
Assessment of maternal & fetal wellbeing
Check indication for IOL
Maternal observations
Fetal observations, including lie, presentation, engagement & Cardiotocograph (CTG)
Refer to fetal monitoring Guideline for guidance on auscultation and continuous monitoring of the fetal heart
Assessment within normal limits?
YES
NO
Explain rationale for delay to woman and document
NO
Confirm with delivery suite if IOL can continue
For obstetric review Plan & Actions to be clearly documented
YES
Cervical assessment, including Bishops Score (BS)
Document on induction sheet (to be filed as part of intrapartum notes)
BS ≥ 7
BS < 7
ARM on Delivery Suite
If not in established labor in 2 hours following ARM, continue with oxytocin infusion as per regime; earlier if indicated
NB: Previous caesarean section/grand multiparity – discuss with Consultant
Pre-labor Rupture of Membranes (PROM)
All other patients apart from PROM & VBAC
Grand multiparty (Parity ≥ 5) Seek Consultant advice
VBAC
Options:
1. PG E2 (Vaginal PGE2) 3mg vaginal tablet into posterior fornix once AND commence oxytocin infusion in 6 hours if not in established labor
2. Commence oxytocin
- Vaginal PGE2 3 mg tab
- PGE2 Vaginal Delivery Systempessary
Insert Foley's catheter OR *Vaginal PGE2 3mg See box below
* vaginal PGE2 tablets in VBAC:
Associated with 2-3 increase risk of scar rupture compared to ARM and oxytocin.
Administration should be avoided if possible
Administration has to be a Consultant decision with careful patient counseling
If given, avoid giving more than once.

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