MATERNAL911






Induction of Labor

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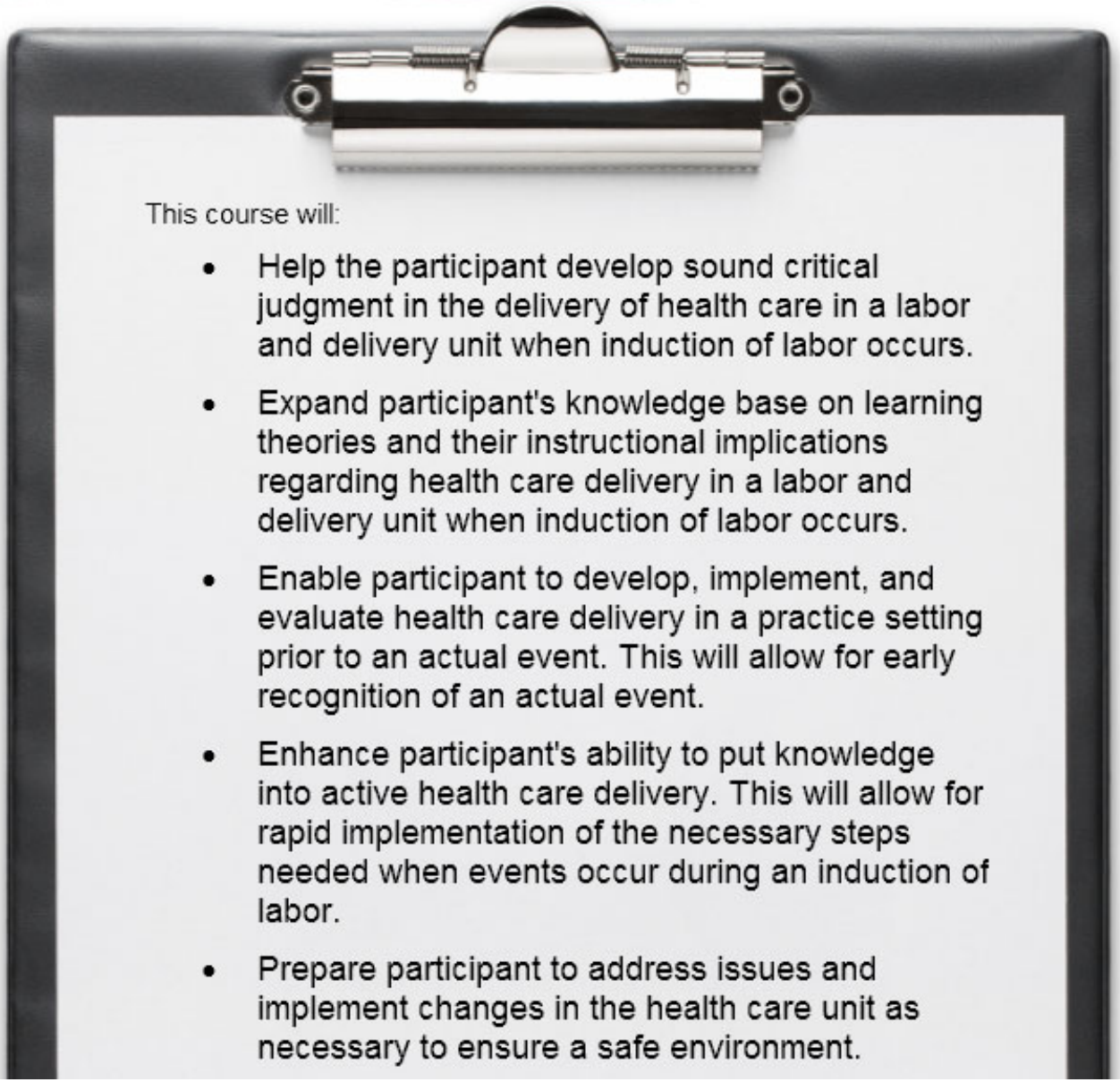


This course will:

- Help the participant develop sound critical judgment in the delivery of health care in a labor and delivery unit when induction of labor occurs.
- Expand participant's knowledge base on learning theories and their instructional implications regarding health care delivery in a labor and delivery unit when induction of labor occurs.
- Enable participant to develop, implement, and evaluate health care delivery in a practice setting prior to an actual event. This will allow for early recognition of an actual event.
- Enhance participant's ability to put knowledge into active health care delivery. This will allow for rapid implementation of the necessary steps needed when events occur during an induction of labor.
- Prepare participant to address issues and implement changes in the health care unit as necessary to ensure a safe environment.

Objectives

Course Description:

Induction of labor (IOL) refers to any technique used to stimulate uterine contractions during pregnancy to accomplish a vaginal delivery. This is performed prior to the onset of spontaneous labor. A successful IOL results in a vaginal birth [1].

Approximate Time to Complete: 45 minutes

Induction of Labor

print version

Introduction

Induction of Labor (IOL)

Induction of labor (IOL) refers to any technique used to stimulate uterine contractions during pregnancy to accomplish a vaginal delivery and is performed prior to the onset of spontaneous labor. A successful IOL results in a vaginal birth [1].

Definition

- The frequency of IOL doubled between 1990 and 2012, from 9.5 to 23.3%.*
- Natality Data File, National Vital Statistics System, identified trends in induction rates are variable by gestational age with declining rates in all gestational age groups since 2012.*
- After nearly 20 years of increases in rates, IOL for singleton births was as high as 23.8% in 2010, declined to 23.7% in 2011, and further declined to 23.3% in 2012.*

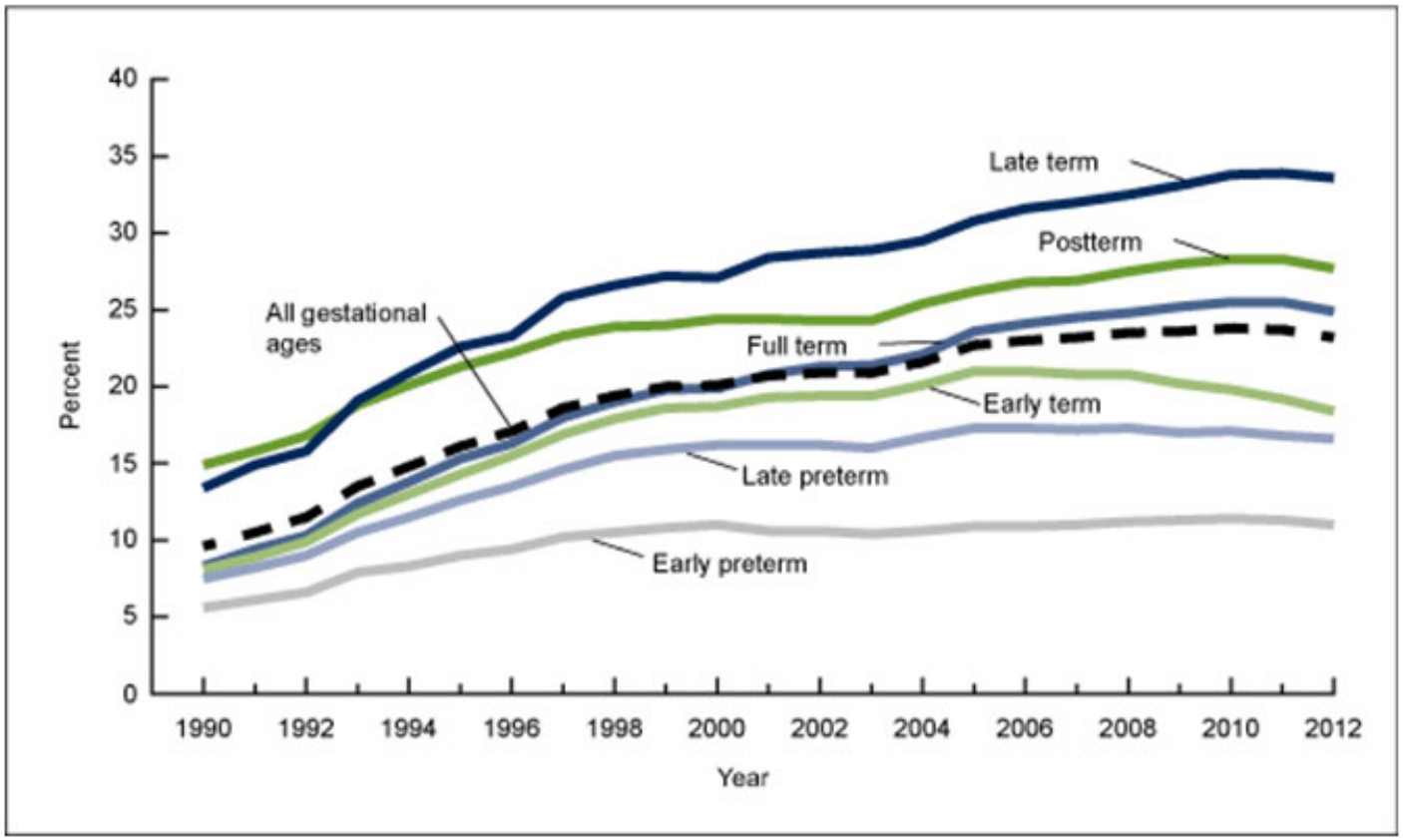
- IOL rates also vary by gestational age, with rates for most age groups declining since 2010. *
- Gestational ages 36, 37, and 38 weeks have continued to decline since 2006. *
- The largest decline is noted at 38 weeks.*
- The decrease in rates of IOL at 38weeks, from 2006 through 2012, declined for all maternal age groups under 40 years of age including the largest race of Hispanic origin groups. *
- The District of Columbia (DC) and 36 states recorded declines of IOL at 38 weeks from 2006 through 2012. The rate of decline ranged from 5% to 48%; rates for 31states and DC declined at least 10%.*

* Reference [2]

Occurrence Rates

After increasing nearly every year since 1990, the IOL rate for singleton births declined in 2011 and 2012.

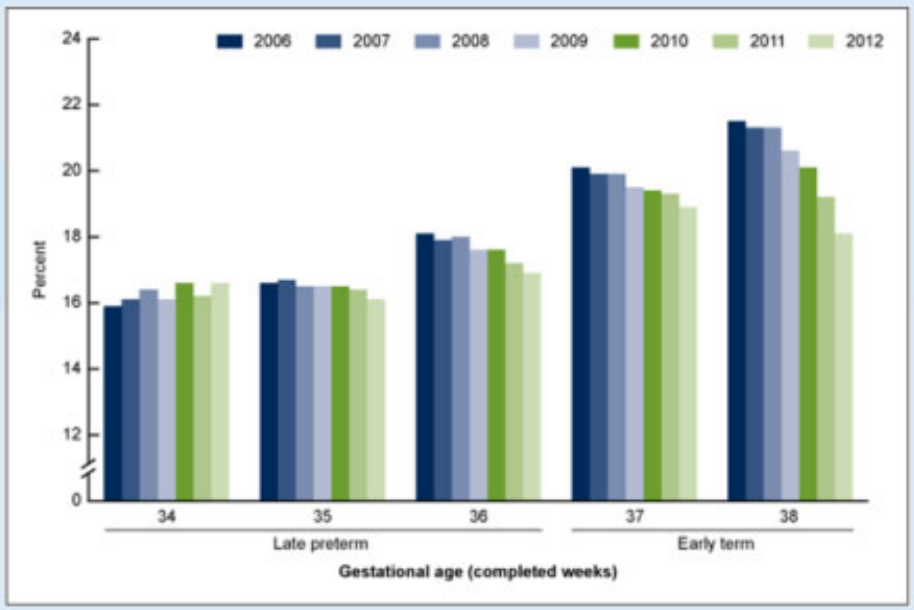
Induction of labor, by gestational age: United States, 1990–2012.



NOTES: Singletons only. Early preterm is less than 34 weeks of gestation; late preterm is 34–36 weeks; early term is 37–38 weeks; full term is 39–40 weeks; late term is 41 weeks; post term is 42 weeks or more.
SOURCE: CDC/NCHS, National Vital Statistics System

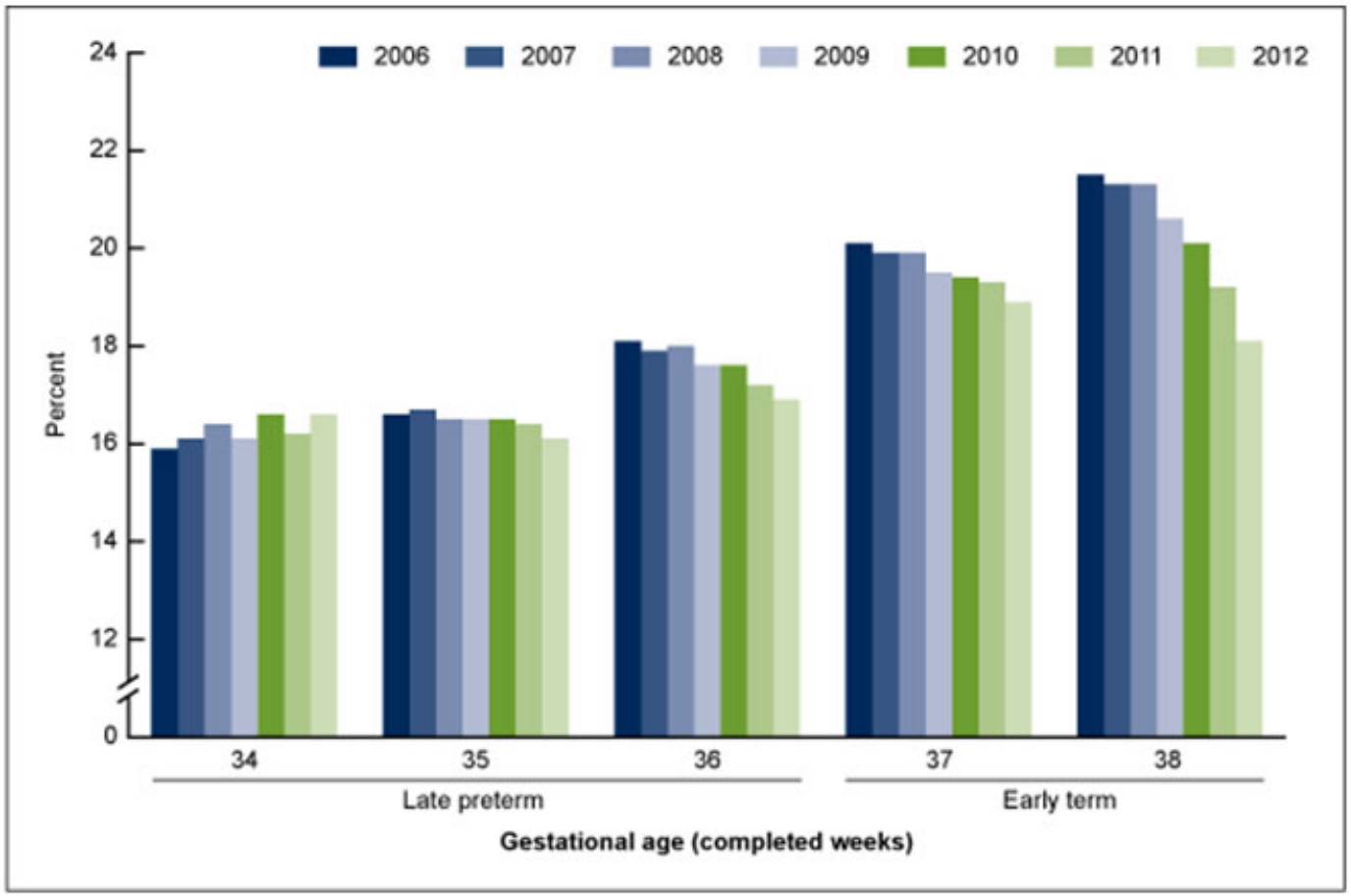
- From 2006 through 2012, induction rates declined at each gestational week 35–38, with the greatest decline at 38 weeks.
- Different patterns emerged in induction rate trends from 2006 through 2012 for late preterm and early-term births.
- The largest changes occurred among early-term births, with induction rates declining at both 37 (down 6%) and 38 (down 16%) weeks.

SOURCE: CDC/NCHS, National Vital Statistics System.



Etiology

Figure 2. Induction of labor at each gestational week 34–38: United States, _2006–2012.



NOTES: Singletons only. Thirty-four, 35, and 36 weeks are late preterm; 37 and 38 weeks are early term.
SOURCE: CDC/NCHS, National Vital Statistics System

Maternal risk factors, medically or obstetrically, based upon the need for early delivery prior to spontaneous labor versus the outcomes of waiting include but are not limited to:

- Eclampsia, severe pre-eclampsia, pre-eclampsia
- Gestational hypertension greater than 38weeks gestation
- Maternal diseases, such as cholestasis of pregnancy
- Chorioamnionitis
- Fetal compromise, such as alloimmunization with fetal anemia
- Preterm rupture of membranes (PROM)
- Rupture of membranes (ROM) prior to the onset of labor
- Multiple gestation
- Diabetes mellitus
- Oligohydramnios
- Intrauterine fetal death (IUFD)
- Post-term pregnancy
- Intrauterine growth restriction (IUGR)
- Deterioration of the placenta [1]

Possible Cause in Variability of IOL Rates

- Fetal risk factors including but not limited to:
  - Congenital anomalies
  - IUGR
  - Mother group B streptococcus (GBS) positive with ROM. IOL with oxytocin should be started as early as possible after ROM to establish labor within 24 hours [4].
- Elective IOL for non-medical reasons, because of the increased rates of morbidity and mortality, should not be performed before 39 weeks of gestation [25].
  - Increase in availability and adequacy of cervical ripening agents and/or healthcare provider.
  - Living a distance from the delivering institution with a history of rapid labor and delivery.
  - Scheduling the delivery date or time with indication for IOL.
    - Acceptable reasons may be extreme rural regions where travel to a health care facility may be difficult due to weather conditions.
  - Fetal macrosomia is not an indication for IOL.
  - Patient or health care provider convenience is not an indication.

Possible Cause in Variability of IOL Rates Cont'd

- All methods of IOL can carry some level of risk for the mother and/or the fetus.
- Risks and benefits of an IOL should be explained and understood by the patient and her family.
- This must include the reason for the IOL
  - Method of induction
  - Indication
  - What will occur if labor cannot be effectively induced for a vaginal birth
- Ensure documentation and confirmation of understanding.
  - Your institution may consider implementation of consent for this procedure.
- A department may consider a method of prioritizing scheduled IOL to ensure the availability of resources and staffing.
  - The algorithm should be based upon fetal and maternal conditions. This will create a safer patient

Preparing for an Induction

Risks of IOL

- Delivery of a preterm infant related to inadequate dating.
- Uterine tachysystole, the excess or abnormal frequency of uterine contractions.
  - American College of Obstetricians and Gynecologists (ACOG) defines tachysystole as more than five contractions in ten minutes, averaged over a 30-minute period.
  - During this time period the fetal heart pattern should be evaluated and documented.
  - Others have defined tachysystole as this, as well as included; doubling or tripling of contractions, resting period between contraception is less than 30 seconds, or contractions last for more than 90 seconds [3].

- ***Note:*** *The terms hypertonus, hypercontractility, and hyperstimulation are no longer used to define a contraction pattern and should not be used [2].*

Risks of IOL

- Amniotic fluid embolism (AFE) rates were increased with medication IOL in a retrospective study [5].
  - The risk is 10.3 per 100,000 births with medical induction versus 5.2 per 100,000 births without medical induction.
- Uterine rupture rates are increased when IOL is implemented; however, the absolute risk is low, with most cases occurring in women with a scarred uterus [6].

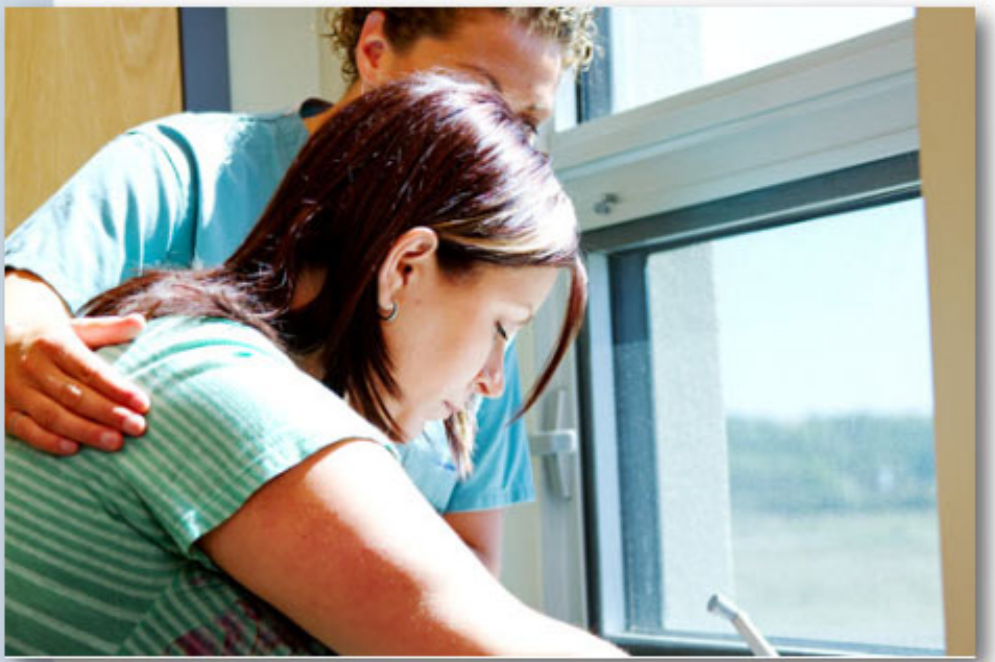
Risks of IOL

- Hyponatremia can occur when oxytocin is used at high doses such as 40 milliunits/minute administered in hypotonic solutions [7].
- Oxytocin infusion via pump or slow infusion drip is recommended as hypotension can occur with rapid infusion [8 & 22].
- Neonatal hyperbilirubinia is typically related to preterm birth but there have been associations with this and the use of oxytocin.

Risks of IOL

- Labor induction may fail and require another form of induction or cesarean delivery.
  - The rate of a cesarean is greater with an unfavorable cervix and if she's never given birth before [9].
- Increased risk for chorioamnionitis increases the risks for mother and baby.
- Artificial rupture of membranes (AROM) may increase the occurrence of prolapse of the umbilical cord.
- Increased rate of operative vaginal delivery, vacuum or forceps [9].
- Postpartum hemorrhage (PPH) [10].
- Umbilical cord prolapsed is increased with IOL with spontaneous rupture of membranes (SROM) or AROM.
- Staff present in the delivery room should remain calm.

- An IOL is contraindicated if conditions are present that would put the woman or fetus at risk if spontaneous labor occurred including:
  - Placenta previa, vasa previa, placenta abruption, or cord presentation
  - Breech fetal lie
  - Previous uterine surgeries
    - Classical cesarean section
    - Full thickness myomectomy
    - Previous uterine rupture
  - Active genital herpes simplex virus (HSV) infection or within four weeks of delivery
  - Pelvic injuries, fractures, or anatomy unfavorable for a vaginal birth
  - Invasive carcinomas of the genital tract
  - Category III fetal heart tracing



Etiology

- Planning an IOL may be necessary if there are health risks for the mother, fetus, or both if the pregnancy continues.
  - This is why scheduling and prioritizing are important.
- The health care team should have a process in place to ensure IOL is performed only when resources are available:
  - Supplies
  - Nursing staff
  - Ancillary staff
  - Physicians for delivery
  - Anesthesia
  - Pediatric personnel
  - The ability to perform a cesarean delivery if needed
- Changes in the cervix generally begins to occur a few weeks before true labor begins.
  - The cervix will soften, thin, and open in preparation for delivery.

Planning and Prevention

- The Bishop score is the best available tool for predicting the likelihood that induction will result in vaginal delivery [11].
- A Bishop's score is based on fetal station, and cervical dilation, effacement, position, and consistency.
- The higher the score the more likely a successful vaginal delivery will occur [1].
- A score greater than 8 is in favor of a vaginal delivery and a score less than or equal to 6 is defined as an unfavorable cervix for IOL or not ready for labor [1].
- For a score less than or equal to 6, medication such as prostaglandins may be given to prepare or 'ripen' the cervix and make labor progress [1].

Score	0	1	2
Cervical dilatation (cm)	<1	1-2	3-4
Length of cervix (cm)	>2	1-2	<1
Station of presenting part (cm)	Spines -3	Spines -2	Spines -1
Consistency	Firm	Medium	Soft
Position	Posterior	Central	Anterior

Bishop Score

- Term pre-labor ROM preferred IOL agent is intravenous (IV) oxytocin.
- Misoprostol (Cytotec) orally is another IOL agent that may be selected, as this agent both assists with cervical ripening and can stimulate uterine contractions [13 & 14].
- Use of misoprostol via oral route eliminates unnecessary vaginal exams which can increase infection rates [13].
- If ROM occurs and the woman is positive for GBS, establishment of labor within 24 hours should be promptly initiated with oxytocin IV [14].
- Oxytocin IV may be used in the case of a trial of labor after cesarean delivery (TOLAC) as the infusion can be controlled [12].
- TOLAC cervical ripening or IOL agents should not include cervical or vaginal prostaglandin E2 (PGE2) or misoprostol as these agents cannot be quickly removed from her system and increased risk of uterine rupture may result [12].

- Oxytocin is a polypeptide hormone produced in the hypothalamus and secreted from the posterior lobe of the pituitary gland in a pulsatile fashion.
- Oxytocin is identical to its synthetic analog, which is among the most potent uterotonic agents.
- Oxytocin causes contractions of the uterine muscle.
- This medication may be used to start labor or to speed labor in a woman who has gone into labor on her own.
- IOL may be accomplished by interventions, using medication, may require a combination of interventions and medication, or change in medication.

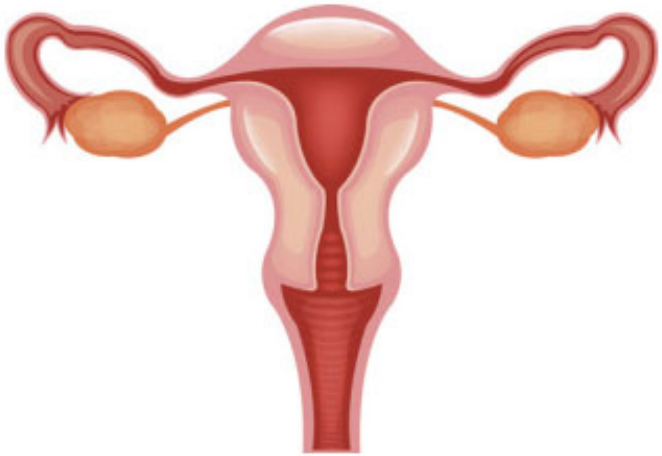
Oxytocin

Other Medication

- PGE2 is a synthetic form of a chemical naturally produced by the body.
  - This may be used to soften or ripen the cervix in a woman with a higher Bishop score, known as an unfavorable cervix.
  - These drugs can be administered orally or inserted into the vagina.

Other Methods

- Laminaria can be inserted into the cervix.
  - A laminaria absorbs fluid and expands causing the cervix to open or dilate.
  - Laminaria have been associated with increased infections both maternal and neonatally when compared to the PGE2 option [1].
- A balloon catheter can be inserted into the cervix, inflated, and expands causing the cervix to open or dilate [16].
  - This form of IOL is associated with fewer episodes of tachysystole compared to PGE2 or misoprostol [15].



- The laminaria and balloon catheters
  - Promote a more localized effect on the cervix versus a systemic response.
  - Are cost effective, and have a lower risk of uterine tachysystole [15].
- Stripping the amniotic membrane from the wall of the uterus can be accomplished with a digital cervical exam.
  - The health care provider will separate the membrane from the uterine wall.
  - This causes the body to release prostaglandins, which soften or ripens the cervix, by means of initiating contractions.
  - Stripping the membranes reduces post-term gestation.

Other Methods Cont'd

- Amniotomy, also known as AROM (Additional Rupture of Membranes), may be effective alone in labor induction.
  - This may be performed when the cervix is partially dilated, effaced, and the fetal head is engaged or down into the maternal pelvis.
  - This is accomplished using a medical instrument which makes a hole in the amniotic sac.
  - This procedure may cause labor to start or speed up labor [17 &18].
    - The fetal heart rate (FHR) is documented before and following the procedure.
    - The color and character of the amniotic fluid is also included in documentation.

Amniotomy

- Nipple stimulation may be utilized for inducing labor. This is natural and inexpensive.
- This method of labor induction has only been studied in low risk populations. [1]

- Management of tachysystole, which can lead to fetal hypoxia, can occur with IOL and may require intrauterine resuscitation:
  - Placing the woman in a left lateral position
  - Administration of oxygen at 10L/min via non-rebreather face mask
  - Increasing IV fluids to provide 500mL or greater of lactated Ringer's solution [17 & 18].
- If no response from these measures, administration of the tocolytic, terbutaline 250mcg subcutaneously or IV should be considered for fetal resuscitation [19 & 20].
- Nitroglycerin can be administered in causes that do not respond to tocolytics.
  - Nitroglycerin 60 to 90 mcg IV is the recommended dose [19 & 20].

Management of Tachysystole

- Tachysystole management based upon IOL agent:
  - Oxytocin use should be discontinued, intrauterine resuscitation, and tocolytics may be needed.
    - The half-life of Oxytocin is 6 to 8 minutes.
    - If discontinued for less than 30 minutes, Oxytocin should be started at a lower dose than was being administered when discontinued [27].
    - If discontinued for more than 30 minutes, restart at initial dose [27].
  - Be alert and prepared for the possibility of postpartum hemorrhage when oxytocin is used for IOL.
- Prostaglandin use requires the removal of the PGE2 insert, Cervidil. If vaginal gel was use, cervical or vaginal lavage is performed to remove this medication.

Management Based Upon Agent

- Hyponatremia
  - If hyponatremia occurs or is suspected, Oxytocin and hypotonic solutions are to be immediately discontinued.
  - Hyponatremia can be corrected by restricting water intake and administering hypertonic saline if necessary.
- Hyperbilirubinemia will be treated according to neonatal guidelines whether occurring from Oxytocin, prematurity, or a combination of both.

Management and Treatment

- Since 1979, ACOG has cautioned against inductions before 39 weeks in the absence of a medical indication [21].
- ACOG has also noted that "a mature fetal lung maturity test result before 39 weeks of gestation, in the absence of appropriate clinical circumstances, is not an indication for delivery" [22 & 23].

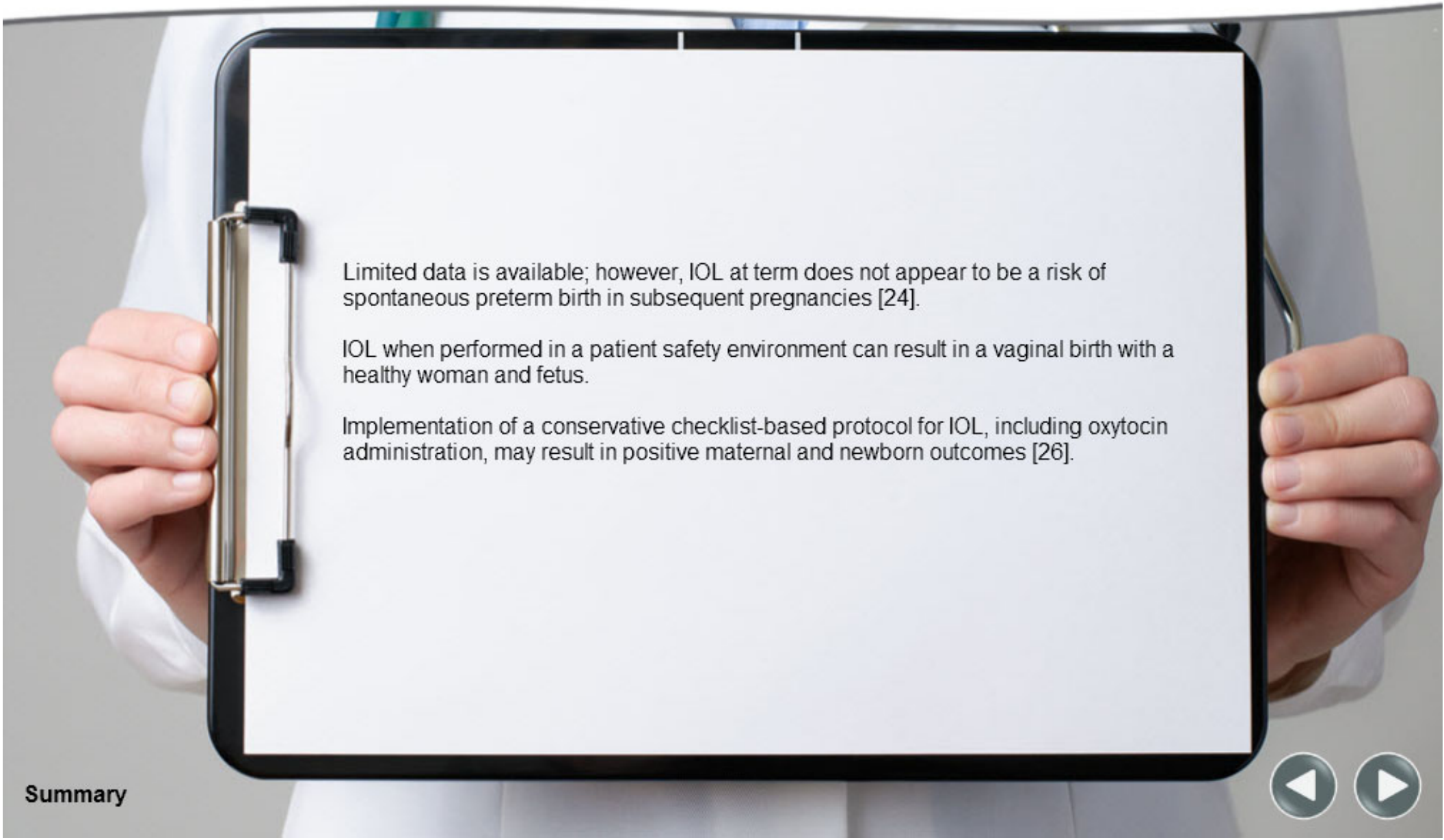
Guidelines from Professional Organizations

Possible Complications

- With inaccurate dating, a fetus may inadvertently be delivered preterm.
- With some methods to induce labor, the uterus can be over stimulated, causing too many contractions.
  - Tachysystole can lead to uterine rupture and fetal compromise.
- Other risks associated with cervical ripening and IOL include but are not limited to:
  - Infection in the mother or baby
  - Uterine rupture
  - Increased risk of a c/s birth

- Oxytocin can lead to:
  - Maternal cardiovascular instability
    - Hypotension
    - Tachycardia
    - Myocardial ischemia
    - Cardiac arrhythmias
  - Nausea and vomiting
  - Headache
  - Flushing
  - Hyponatremia
- PGE2 may cause side effects that vary depending on the type of prostaglandin, the dose, and the route of administration:
  - Fever
  - Chills
  - Vomiting
  - Diarrhea
- Failed IOL can result if the cervix is not appropriately ripened prior to implementing other measures.
- One ripening agent may be all that is required for one woman; however, some women may require another agent to achieve an appropriate Bishop score [24].

Side Effects of Medication


Limited data is available; however, IOL at term does not appear to be a risk of spontaneous preterm birth in subsequent pregnancies [24].
IOL when performed in a patient safety environment can result in a vaginal birth with a healthy woman and fetus.
Implementation of a conservative checklist-based protocol for IOL, including oxytocin administration, may result in positive maternal and newborn outcomes [26].
Summary

Congratulations!

You have successfully completed this module.

Click on the above 'X' to take the post-test for this course. If you do not attain a passing score after two attempts at the post-test the entire program must be repurchased.

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