

# Obstetrics

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**Obstetrics** is the field of study concentrated on pregnancy, childbirth, and the postpartum period. As a medical specialty, obstetrics is combined with gynaecology under the discipline known as obstetrics and gynaecology (OB/GYN).

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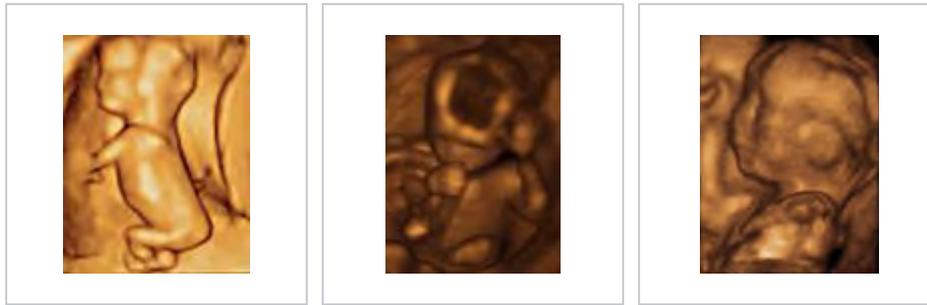


Childbirth labor

## Main areas

### Prenatal care

Prenatal care is important in screening for various complications of pregnancy. This includes routine office visits with physical exams and routine lab tests:



3D ultrasound of 3-inch (76 mm) fetus (about 14 weeks gestational age)

Foetus at 17 weeks

Foetus at 20 weeks

### First trimester

- Complete blood count (CBC)
- Blood type
- General antibody screen (indirect Coombs test) for HDN
  - Rh D negative antenatal patients should receive RhoGam at 28 weeks to prevent Rh disease.
- Rapid plasma reagin (RPR) to screen for syphilis
- Rubella antibody screen
- Hepatitis B surface antigen
- Gonorrhea and Chlamydia culture
- PPD for tuberculosis
- Pap smear
- Urinalysis and culture
- HIV screen

Genetic screening for Down syndrome (trisomy 21) and trisomy 18, the national standard in the United States, is rapidly evolving away from the AFP-Quad screen for Down syndrome, done typically in the second trimester at 16–18 weeks. The newer integrated screen (formerly called F.A.S.T.E.R for First And Second Trimester Early Results) can be done at 10 plus weeks to 13 plus weeks with an ultrasound of the fetal neck (thick skin is bad) and two chemicals (analytes) PAPP-A and  $\beta$ HCG (pregnancy hormone level itself). It gives an accurate risk profile very early. A second blood screen at 15 to 20 weeks refines the risk more accurately. The cost is higher than an "AFP-quad" screen due to the ultrasound and second blood test, but it is quoted to have a 93% pick up rate as opposed to 88% for the standard AFP/QS. This is an evolving standard of care in the United States.

### Second trimester

- MSAFP/quad. screen (four simultaneous blood tests) (maternal serum AFP, inhibin A, estriol, &  $\beta$ HCG) - elevations, low numbers or odd patterns correlate with neural tube defect risk and increased risks of trisomy 18 or trisomy 21
- Ultrasound either abdominal or transvaginal to assess cervix, placenta, fluid and baby

- Amniocentesis is the national standard (in what country) for women over 35 or who reach 35 by mid pregnancy or who are at increased risk by family history or prior birth history.

### Third trimester

- [Hematocrit] (if low, the mother receives iron supplements)
- Group B Streptococcus screen. If positive, the woman receives IV penicillin or ampicillin while in labor—or, if she is allergic to penicillin, an alternative therapy, such as IV clindamycin or IV vancomycin.
- Glucose loading test (GLT) - screens for gestational diabetes; if  $> 140$  mg/dL, a glucose tolerance test (GTT) is administered; a fasting glucose  $> 105$  mg/dL suggests gestational diabetes.

Most doctors do a sugar load in a drink form of 50 grams of glucose in cola, lime or orange and draw blood an hour later (plus or minus 5 minutes) ; the standard modified criteria have been lowered to 135 since the late 1980s

### Foetal assessments

Obstetric ultrasonography is routinely used for dating the gestational age of a pregnancy from the size of the foetus, determine the number of foetuses and placentae, evaluate for an ectopic pregnancy and first trimester bleeding, the most accurate dating being in first trimester before the growth of the foetus has been significantly influenced by other factors. Ultrasound is also used for detecting congenital anomalies (or other foetal anomalies) and determining the biophysical profiles (BPP), which are generally easier to detect in the second trimester when the foetal structures are larger and more developed. Specialised ultrasound equipment can also evaluate the blood flow velocity in the umbilical cord, looking to detect a decrease/absence/reversal or diastolic blood flow in the umbilical artery.



X-rays and computerized tomography (CT) are not used, especially in the first trimester, due to the ionizing radiation, which has teratogenic effects on the foetus. No effects of magnetic resonance imaging (MRI) on the foetus have been demonstrated,<sup>[1]</sup> but this technique is too expensive for routine observation. Instead, obstetric ultrasonography is the imaging method of choice in the first trimester and throughout the pregnancy, because it emits no radiation, is portable, and allows for realtime imaging.

The safety of frequent ultrasound scanning has not be confirmed. Despite this, increasing numbers of women are choosing to have additional scans for no medical purpose, such as gender scans, 3D and 4D scans. A normal gestation would reveal a gestational sac, yolk sac, and fetal pole. The gestational age can be assessed by evaluating the mean gestational sac diameter (MGD) before week 6, and the crown-rump length after week 6. Multiple gestation is evaluated by the number of placentae and amniotic sacs present.

Other tools used for assessment include:

- Foetal screening is used to help assess the viability of the foetus, as well as congenital abnormalities.
- Foetal karyotype can be used for the screening of genetic diseases. This can be obtained via amniocentesis or chorionic villus sampling (CVS)
- Foetal haematocrit for the assessment of foetal anemia, Rh isoimmunization, or hydrops can be determined by percutaneous umbilical blood sampling (PUBS), which is done by placing a needle through the abdomen into the uterus and taking a portion of the umbilical cord.
- Foetal lung maturity is associated with how much surfactant the foetus is producing. Reduced production of surfactant indicates decreased lung maturity and is a high risk factor for infant respiratory distress syndrome. Typically a lecithin:sphingomyelin ratio greater than 1.5 is associated with increased lung maturity.
- Nonstress test (NST) for foetal heart rate
- Oxytocin challenge test

### Intercurrent diseases

A pregnant woman may have intercurrent diseases, that is, other diseases or conditions (not directly caused by the pregnancy) that may become worse or be a potential risk to the pregnancy.

- Diabetes mellitus and pregnancy deals with the interactions of diabetes mellitus (not restricted to gestational diabetes) and pregnancy. Risks for the child include miscarriage, growth restriction, growth acceleration, foetal obesity (macrosomia), polyhydramnios and birth defects.
- Systemic lupus erythematosus and pregnancy confers an increased rate of foetal death *in utero* and spontaneous abortion (miscarriage), as well as of neonatal lupus.
- Thyroid disease in pregnancy can, if uncorrected, cause adverse effects on foetal and maternal well-being. The deleterious effects of thyroid dysfunction can also extend beyond pregnancy and delivery to affect neurointellectual development in the early life of the child. Demand for thyroid hormones is increased during pregnancy, and may cause a previously unnoticed thyroid disorder to worsen.
- Hypercoagulability in pregnancy is the propensity of pregnant women to develop thrombosis (blood clots). Pregnancy itself is a factor of hypercoagulability (pregnancy-induced hypercoagulability), as a physiologically adaptive mechanism to prevent *post partum* bleeding.<sup>[2]</sup> However, when combined with an additional underlying hypercoagulable states, the risk of thrombosis or embolism may become substantial.<sup>[2]</sup>

### Induction and labour

Induction is a method of artificially or prematurely stimulating labour in a woman. Reasons to induce can include pre-eclampsia, foetal distress, placental malfunction, intrauterine growth retardation and failure to progress through labour increasing the risk of infection and foetal distresses.

Induction may be achieved via several methods:

- Disturbance of cervical membranes
- Pessary of *Prostin* cream, prostaglandin E<sub>2</sub>
- Intravaginal or oral administration of misoprostol
- Cervical insertion of a 30-mL Foley catheter

- Rupturing the amniotic membranes
- Intravenous infusion of synthetic oxytocin (Pitocin or Syntocinon)

During labour, the obstetrician carries out the following tasks:

- Monitor the progress of labour, by reviewing the nursing chart, performing vaginal examination, and assessing the trace produced by a foetal monitoring device (the cardiotocograph)
- Provide pain relief, either by nitrous oxide, opiates, or by epidural anaesthesia done by anaesthetists, an anaesthesiologist, or a nurse anaesthetist.
- Caesarean section, if there is an associated risk with vaginal delivery, as such foetal or maternal compromise.

## Complications and emergencies

The main emergencies include:

- Ectopic pregnancy is when an embryo implants in the uterine (Fallopian) tube or (rarely) on the ovary or inside the peritoneal cavity. This may cause massive internal bleeding.
- Pre-eclampsia is a disease defined by a combination of signs and symptoms that are related to maternal hypertension. The cause is unknown, and markers are being sought to predict its development from the earliest stages of pregnancy. Some unknown factors cause vascular damage in the endothelium, causing hypertension. If severe, it progresses to eclampsia, where seizures occur, which can be fatal. Preeclamptic patients with the HELLP syndrome show liver failure and Disseminated intravascular coagulation (DIC). The only treatment is to deliver the foetus. Women may still develop pre-eclampsia following delivery.
- Placental abruption is where the placenta detaches from the uterus and the woman and foetus can bleed to death if not managed appropriately.
- Foetal distress where the foetus is getting compromised in the uterine environment.
- Shoulder dystocia where one of the foetus' shoulders becomes stuck during vaginal birth. There are many risk factors, including macrosomic (large) foetus, but many are also unexplained.
- Uterine rupture can occur during obstructed labour and endanger foetal and maternal life.
- Prolapsed cord can only happen after the membranes have ruptured. The umbilical cord delivers before the presenting part of the foetus. If the foetus is not delivered within minutes, or the pressure taken off the cord, the foetus dies.
- Obstetrical hemorrhage may be due to a number of factors such as placenta previa, uterine rupture or tears, uterine atony, retained placenta or placental fragments, or bleeding disorders.
- Puerperal sepsis is an ascending infection of the genital tract. It may happen during or after labour. Signs to look out for include signs of infection (pyrexia or hypothermia, raised heart rate and respiratory rate, reduced blood pressure), and abdominal pain, offensive lochia (blood loss) increased lochia, clots, diarrhea and vomiting.

## Postnatal care

Postnatal care is care provided to the mother following parturition.

A woman in the Western world who is delivering in a hospital may leave the hospital as soon as she is medically stable and chooses to leave, which can be as early as a few hours postpartum, though the average for spontaneous vaginal delivery (SVD) is 1–2 days, and the average caesarean section postnatal stay is 3–4 days.

During this time the mother is monitored for bleeding, bowel and bladder function, and baby care. The infant's health is also monitored.

Certain things must be kept in mind as the physician proceeds with the post-natal care.

1. General condition of the patient.
2. Check for vital signs (pulse, blood pressure, temperature, respiratory rate, (pain) at times)
3. Palour?
4. Edaema?
5. Dehydration?
6. Fundus (height following parturition, and the feel of the fundus) (Per abdominal examination)
7. If an episiotomy or a C-section was performed, check for the dressing. Intact, pus, oozing, haematomas?
8. Lochia (colour, amount, odour)?
9. Bladder (keep the patient catheterized for 12 hours following local anaesthesia and 24–48 hours after general anaesthesia) ? (check for bladder function)
10. Bowel movements?
11. More bowel movements?
12. Follow up with the neonate to check if they are healthy.

## History

Prior to the 18th century, caring for pregnant women in Europe was confined exclusively to women, and rigorously excluded men. The expectant mother would invite close female friends and family members to her home to keep her company.<sup>[3]</sup> Skilled midwives managed all aspects of the labour and delivery. The presence of physicians and surgeons was very rare and only occurred once a serious complication had taken place and the midwife had exhausted all measures to manage the complication. Calling a surgeon was very much a last resort and having men deliver women in this era whatsoever was seen as offending female modesty.<sup>[4][5]</sup>

### Before the 18th century

Obstetrics prior to the 18th and 19th centuries was not recognized as a specific specialty. However, the subject matter and interest in the female reproductive system and sexual practice can be traced back to Ancient Egypt<sup>[6]</sup> and Ancient Greece.<sup>[7]</sup> Soranus of Ephesus sometimes is called the most important figure in ancient gynecology. Living in the late first century A.D. and early second century he studied anatomy and had opinions and techniques on abortion, contraception –most notably coitus interruptus– and birth complications. After the death of Soranus, techniques and works of gynecology declined but very little of his works were recorded and survived to the late 18th century when gynaecology and obstetrics reemerged.<sup>[8]</sup>

## 18th century

The 18th century marked the beginning of many advances in European midwifery. These advances in knowledge were mainly regarding the physiology of pregnancy and labour. By the end of the century, medical professionals began to understand the anatomy of the uterus and the physiological changes that take place during labour. The introduction of forceps in childbirth also took place during the 18th century. All these medical advances in obstetrics were a lever for the introduction of men into an arena previously managed and run by women—midwifery.<sup>[9]</sup>

The addition of the male-midwife is historically a significant change to the profession of obstetrics. In the 18th century medical men began to train in area of childbirth and believed with their advanced knowledge in anatomy that childbirth could be improved. In France these male-midwives were referred to as "accoucheurs". This title was later on lent to male-midwives all over Europe. The founding of lying-hospitals also contributed to the medicalization and male-dominance of obstetrics. These lying-hospitals were establishments where women would come to have their babies delivered, which had prior been unheard of since the midwife normally came to home of the pregnant woman. This institution provided male-midwives or accoucheurs with an endless number of patients to practice their techniques on and also was a way for these men to demonstrate their knowledge.<sup>[10]</sup>

Many midwives of the time bitterly opposed the involvement of men in childbirth. Some male practitioners also opposed the involvement of medical men like themselves in midwifery, and even went as far as to say that men-midwives only undertook midwifery solely for perverse erotic satisfaction. The accoucheurs argued that their involvement in midwifery was to improve the process of childbirth. These men also believed that obstetrics would forge ahead and continue to strengthen.<sup>[4]</sup>

## 19th century

Even 18th century physicians expected that obstetrics would continue to grow, the opposite happened. Obstetrics entered a stage of stagnation in the 19th century, which lasted until about the 1880s.<sup>[3]</sup> The central explanation for the lack of advancement during this time was substantially due to the rejection of obstetrics by the medical community. The 19th century marked an era of medical reform in Europe and increased regulation over the medical profession. Major European institutions such as The College of Physicians and Surgeons considered delivering babies ungentlemanly work and refused to have anything to do with childbirth as a whole. Even when Medical Act 1858 was introduced, which stated that medical students could qualify as doctors, midwifery was entirely ignored. This made it nearly impossible to pursue an education in midwifery and also have the recognition of being a doctor or surgeon. Obstetrics was pushed to the side.<sup>[11]</sup>



Two midwives assisting a woman in labour on a birth chair in the 16th century, from a work by Eucharius Rößlin.

By the late 19th century the foundation of modern-day obstetrics and midwifery began developing. Delivery of babies by doctors became popular and readily accepted, but midwives continued to play a role in childbirth. Midwifery also changed during this era due to increased regulation and the eventual need for midwives to become certified. Many European countries by the late 19th century were monitoring the training of midwives and issued certification based on competency. Midwives were no longer uneducated in the formal sense.<sup>[12]</sup>

As midwifery began to develop so did the profession of obstetrics near the end of the century. Childbirth was no longer unjustifiably despised by the medical community as it once had been at the beginning of the century. But the specialty was still behind in its development stages in comparison to other medical specialties, and remained a generality in this era. Many male physicians would deliver children but very few would have referred to themselves as obstetricians. The end of the 19th century did mark a significant accomplishment in the profession with the advancements in asepsis and anaesthesia, which paved the way for the mainstream introduction and later success of the Caesarean Section.<sup>[12][13]</sup>

Before the 1880s mortality rates in lying-hospitals would reach unacceptably high levels and became an area of public concern. Much of these maternal deaths were due to Puerperal fever, at the time commonly known as childbed fever. In the 1800s Dr. Ignaz Semmelweis noticed that women giving birth at home had a much lower incidence of childbed fever than those giving birth by physicians in lying-hospitals. His investigation discovered that washing hands with an antiseptic solution before a delivery reduced childbed fever fatalities by 90%.<sup>[14]</sup> So it was concluded that it was physicians who had been spreading disease from one labouring mother to the next. Despite the publication of this information, doctors still would not wash. It was not until the 20th century when advancements in aseptic technique and the understanding of disease would play a significant role in the decrease of maternal mortality rates among many populations.

## History of obstetrics in America

The development of obstetrics as a practice for accredited doctors happened at the turn of the 18th century and thus was very differently developed in Europe and in the Americas due to the independence of many countries in the Americas from European powers. “Unlike in Europe and the British Isles, where midwifery laws were national, in America, midwifery laws were local and varied widely”<sup>[15]</sup>

Gynaecology and Obstetrics gained attention in the American medical field at the end of the nineteenth century through the development of such procedures as the ovariectomy. These procedures then were shared with European surgeons who replicated the surgeries. It should be noted that this was a period when antiseptic, aseptic or anaesthetic measures were just being introduced to surgical and observational procedures and without these procedures surgeries were dangerous and often fatal. Following are two surgeons noted for their contributions to these fields include Ephraim McDowell and James Marion Sims.

Ephraim McDowell developed a surgical practice in 1795 and performed the first ovariectomy in 1809 on a 47-year-old widow who then lived on for thirty-one more years. He had attempted to share this with John Bell whom he had practiced under who had retired to Italy. Bell was said to have died without seeing the document but it was published by an associate in *Extractions of Diseased Ovaria* in 1825. By the mid-century the surgery was both successfully and unsuccessfully being performed. Pennsylvanian

surgeons the Attlee brothers made this procedure very routine for a total of 465 surgeries—John Attlee performed 64 successfully of 78 while his brother William reported 387— between the years of 1843 and 1883. By the middle of the nineteenth century this procedure was successfully performed in Europe by English surgeons Sir Spencer Wills and Charles Clay as well as French surgeons Eugène Koeberlé, Auguste Nélation and Jules Peau.<sup>[16]</sup>

J. Marion Sims was the surgeon responsible for being the first treating a vesicovaginal fistula<sup>[16]</sup>—a condition linked to many caused mainly by prolonged pressing of the fetus against the pelvis or other causes such as rape, hysterectomy, or other operations— and also having been doctor to many European royals and the 20th President of the United States James A. Garfield after he had been shot. Sims does have a controversial medical past. Under the beliefs at the time about pain and the prejudice towards African people, he had practiced his surgical skills and developed skills on slaves.<sup>[17]</sup> These women were the first patients of modern gynecology. One of the women he operated on was named Anarcha, the woman he first treated for a fistula.<sup>[18]</sup>

## Historical role of gender

Women and men inhabited very different roles in natal care up to the 18th century. The role of a physician was exclusively held by men who went to university, an overly male institution, who would theorize anatomy and the process of reproduction based on theological teaching and philosophy. Many beliefs about the female body and menstruation in the 17th and 18th centuries were inaccurate; clearly resulting from the lack of literature about the practice.<sup>[19]</sup> Many of the theories of what caused menstruation prevailed from Hippocratic philosophy.<sup>[20]</sup> Midwives of this time were those assisted in the birth and care of both born and unborn children, and as the name suggests this position held mainly by women.

During the birth of a child, men were rarely present. Women from the neighbourhood or family would join in on the process of birth and assist in many different ways. The one position where men would help with the birth of a child would be in the sitting position, usually when performed on the side of a bed to support the mother.<sup>[21]</sup>

Men were introduced into the field of obstetrics in the nineteenth century and resulted in a change of the focus of this profession. Gynaecology directly resulted as a new and separate field of study from obstetrics and focused on the curing of illness and indispositions of female sexual organs. This had some relevance to some conditions as menopause, uterine and cervical problems, and childbirth could leave the mother in need of extensive surgery to repair tissue. But, there was also a large blame of the uterus for completely unrelated conditions. This led to many social consequences of the nineteenth century.<sup>[19]</sup>

## See also

- Childbirth and obstetrics in antiquity
- Henry Jacques Garrigues, who introduced antiseptic obstetrics to North America
- Maternal-fetal medicine
- Obstetrical nursing



Wikimedia Commons has media related to ***Obstetrics***.

- Obstetric ultrasonography
- Puerperum

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